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(14) CCA-79-09

(10) Joanne Z. Sattley

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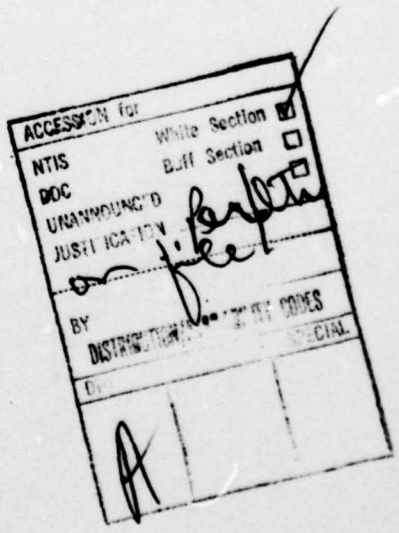

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1. Overview

For a number of years, the Nuclear Monitoring Research Office (NMRO) has sponsored the development of tools and techniques which have been of value in advancing seismological research. But only with the development of large-database techniques has it been possible for seismologists to do meaningful analytical work over the vast quantities of data which represent seismic activity.

Instruments, installed world-wide, detect, acquire and measure seismic readings. And computers are employed in virtually every aspect of collecting, analyzing, processing and storing seismic waveform data.

At CCA, the Datacomputer [MARILL and STERN] was developed under ARPA funding to function as a first-of-a-kind network data utility for the support of very large databases, allowing shared remote access by heterogeneous computers in a network environment. The Datacomputer thus provides the facility required to store online the very large amounts of seismic data being collected, plus database management tools which allow users of seismic

data to retrieve selected, manageable-sized portions of a database for analysis.

The current traffic of seismic data to the Datacomputer fills a single Tera-Bit Memory (TBM) tape reel -- which represents one-fourth of the on-line mass storage of the Datacomputer in its present configuration -- to its usable capacity in about six weeks. Two TBM drives are normally devoted to tapes of basic seismic readings, thus providing on-line access to seismic data over a six- to twelve-week period. The off-line tapes are, of course, always available and are mounted upon request.

The basic data in this on-line window is accompanied by an ever-increasing amount of event summary information which is also stored on the Datacomputer in a series of Event Summary Files (ESF). These are sufficiently small that they will all be retained online indefinitely.

This data collection has already been very useful to seismic researchers. However, in an effort to increase the span of the on-line data window from the current nearly two-month period to an even more valuable and productive twelve-month period, a file of extracted seismic readings -- those directly associated with events in the Event Summary Files -- was planned. The basic foundation for this set of files, the Signal Waveform

Files (SWF), was laid out in August 1977, jointly by representatives of ARPA-NMRO, Vela Seismological Center (VSC), Lincoln Laboratories Applied Seismology Group (LL-ASG), and the Seismic Data Analysis Center (SDAC).

Both SDAC and CCA will contribute to this SWF database: SDAC is responsible for storing array data and other data readings which do not exist in any other form on the Datacomputer. Such data will be stored directly into the Signal Waveform File in segments corresponding to entries in the Event Summary Files.

CCA is responsible for storing Seismic Research Observatory (SRO) data segments which already exist on the Datacomputer, but which are embedded in the very large basic seismic data files: the non-array long-period files (NLPF) and the non-array short-period files (NSPF). Readings containing the data for seismic events which have been detected and marked in the Event Summary File by SDAC, are simply copied into the Signal Waveform Files, once these stretches of basic data have been located and delimited. The computer program which finds and copies the data segments over to the waveform files is described in this document.

In addition, as a by-product of the preliminary information-gathering needed for the waveform copying

process, the program generates a list of all the recorded short-period detections. This list is stored on the Datacomputer in one-month chunks as a set of files known as the SPDET files, the first of which is for January, 1978.

The SPDET files are already being used in studies conducted by the Lincoln Laboratory Applied Seismology Group [LINCOLN].

The design of the SWF-D program [CCA a] calls for the modular construction of the software components, and the implementation has followed this criterion. It is anticipated that the attainment of full service operation later this year will result in a further increase in Datacomputer usage by the seismic research community.

2. Introduction

This document describes the implementation and test of the SWF-D program which has been developed by CCA to find and copy non-array data from the Seismic Research Observatory (SRO) data files stored on the Datacomputer to the Signal Waveform Files which are also stored on the Datacomputer. The operation is driven by entries marked by SDAC in the Event Summary Files.

Due to the nature of the database, the constraints placed upon the program, and the desired operational characteristics, the program was engineered with a high degree of flexibility. These general issues are discussed in Section 3; and more specific implementation details are described in Section 4. The logical description closely adheres to the physical organization of the program in order to facilitate cross-referencing with the companion document containing source-code program listings [CCA b].

Also included in this document, in Section 5 below, is a description of the test data furnished by SDAC, and the use we made of it for testing the SWF-D program. The list of arrivals, flagged by SDAC, appear in Appendix E, Section 1.

The remainder of the document has been arranged into appendices for use as a reference text, as may be necessary for correcting or modifying the program. Clearly, even if no modifications or corrections to the running program were required, situations will arise which will be beyond the scope of the automated program to solve. At such times, the services of a maintenance programmer will be needed; and an effort has been made to include a number of facilities which might prove useful and worthwhile.

The Datacomputer FILE and PORT descriptions in Appendices A and B correspond to the working versions as of 2 July 1978, the selected test date. The actual Datalanguage used by the program for communicating with the Datacomputer is displayed in Appendix C.

Scripts of Datacomputer sessions, edited to improve their readability by the addition of commentary and by the removal of extraneous repetitive lines, compose Appendix D. Leafing though them is one way of deriving a sense of program flow for a given task.

Appendices F, G and H contain information related to the operation of the program, its operations log, and interrupt-level capabilities, as well as samples of the useful advisory information which is periodically distributed by the Albuquerque Seismological Laboratory.

For the reader's convenience, a glossary of abbreviations used in this document is given in Appendix I.

3. Technical Approach

The CCA SWF-D program is designed to be reliable, efficient, and responsive to its working environment. It operates on CCA-Tenex, an Arpanet Server Host, in background mode without scheduled operator action or intervention.

When placed on the Tenex startup command queue, the program will automatically begin operation whenever Tenex is started. Similarly, it will reliably resume operation after operating-system failure. That is to say, in the case of a Tenex crash, the program is automatically restarted by Tenex as part of its standard initialization sequence.

The SWF-D ("D" for "Demon") program has been written in the BCPL Compiler Language [BBN], a high-level language maintained for Tenex by BBN. Some of CCA's recent software work [CCA d] [SATTLEY] has been done using this language, and its use as a programming tool has met with general approval.

Because SWF-D operates on the same computer system as the DC-203 Datacomputer, it needs to avoid imposing a crushing load .on either Tenex or the Datacomputer. Tenex provides facilities for inspecting operating-system status, and the SWF-D startup-control logic makes use of them so that during high-load situations, the program does not start up.

In order to retrieve Datacomputer status information, the SWF-D program makes use of an existing status checker program, DCSTAT [CCA f]. The information obtained is used to inhibit operation if the Datacomputer is heavily loaded or is not available.

SWF-D communicates with the Datacomputer via the Arpanet in the manner of a normal Datacomputer user [CCA c], utilizing an existing package of subroutines to accomplish the network transmissions [CCA e]. This interface package was originally developed at CCA and is currently being maintained by CCA personnel.

If the Datacomputer is unavailable, or if the net connection fails during regular program execution, the SWF-D program will suspend its operations for a computed interval of time. After periods of suspension, the program can resume running from where it left off. Records of successful file transfers and task progress are

kept by SWF-D on Tenex files so that only incomplete transactions will need to be restarted.

Because of the way in which the non-array readings are routed to the Datacomputer, some of the SWF candidates may not yet be on file at the time they are requested, or they may be only partially available. For efficient operation, the SWF-D program needs to recognize the non-availability or partial availability of the seismic data desired. For that purpose, we have provided two kinds of tests, one which applies to long-period SRO data, the other, to short-period SRO data. Both types of data are stored in multi-site files grouped by day; however, the long-period data files are filled in continuous chronological order without any pre-planned time gaps, whereas the short-period data files are usually not continuous but are, rather, segments which were recorded during a detection interval. Additionally, the short-period data may be fragmented somewhat by the Albuquerque Seismological Laboratory (ASL) when factoring out instrument-related anomalies such as calibration readings, etc. See Appendix H, Section 2, for an excerpt from ASL's summary of the qualifications which exist on the recorded data.

For the long-period files, expected data availability is based upon the date(s) specified in the periodic report of "Digital Seismic Data Transmitted to Datacomputer" via Arpanet message from ASL: all available long-period data up until the specified date for each station will have already been transmitted. A sample copy of an ASL advisory note is shown in Appendix H, Section 1.

For the period of operation between the receipt of one message and the next such message, we pick a cut-off date for our own time frame, in order to strike a balance between leaving till later a lot of data which could be processed, and uselessly requesting data which have not yet arrived. To accommodate this operation, the program is designed to accept a manually-input date without requiring recompilation.

Thus, if the date of a requested data segment is earlier than our record of the latest transmission date for a site, it is deemed reasonable for SWF-D to attempt to find and copy it.

For short-period files, determining data availability is a bit more complicated. To help in checking for which readings may be available, the SWF-D program pre-processes the short-period files and generates a list of the recorded detections on each full cycle through its task

queue. The list, sorted into monthly Datacomputer files, is used as a map which can be consulted for deciding whether to attempt to retrieve the desired data.

The SWF-D program comprises separately-compilable components -- modules -- which operate independently of one another to accomplish their prescribed tasks: sifting the Event Summary Files for marked arrivals, copying the requested waveforms into the Signal Waveform Files, and generating the SPDET files.

Each program module is capable of recognizing when there is work for it to do, logging in a separate Datacomputer job, generating a script file for the session, interacting with the Datacomputer to manipulate the relevant files, reporting task progress on an operations log file, and terminating the session when a pre-programmed quota of work has been performed. Section 4 below describes the program in greater detail.

4. Program Description

This section describes the significant technical aspects of the key components of the SWF-D program. The organization of this section conforms closely to the layout of the actual program code, which is being distributed in a companion document [CCA-b].

The overall approach was defined by the collection of tasks that need to be performed:

- to accumulate requests for moving waveform segments by sifting the Event Summary Files for flagged arrivals;
- to copy the desired long-period and short-period waveforms into the Signal Waveform Files; and
- to generate a map of the short-period detections for use when determining expected data availability.

The solutions devised for performing these tasks are described in more detail below. The SWF-Demon program control module which ties the various parts together is described first.

4.1 The Main Control Module

The SWF-Demon program's Main Control Module contains the logic for initiating program execution and for restarting interrupted sessions. It is responsible for generating the working environment, dynamically creating part of the program structure, setting up the interrupt-handling processors, testing the operating system load average and Datacomputer status, making entries into an operations log for task status information, setting up and calling the next task to be performed, and restarting partially completed tasks.

As part of the initialization process, a Tenex fork is created and loaded with the DCSTAT (Datacomputer status report) program. Any problems encountered here could mean that Tenex or the Arpanet are in poor condition, or that the program files have been disrupted. The situation will need to be checked out by the program maintainer and the

error condition corrected prior to resuming SWF-D program execution.

Next, the program sets up the interrupt-handling processors which allow an attached operator to interrupt the running program by typing either control-L or control-S. These interactive routines are described in the next two sub-sections: 4.1.1 for control-L and 4.1.2 for control-S. The interactions themselves are described in Appendix G.

There are three Tenex files which are important to the operation of the overall program, since it relies upon the information stored in them to keep track of its work.

These files are listed below along with a summary of their contents:

Tenex Filename	Contents
SWF-D.WORK%SCHEDULE	The task queue, the load-limit value, and the date of the last Event Summary File scanned.
SWF-D.STATION%DATA	The SRO station names, the date of the most recent seismic data transmitted from each, and the date of the last short-period file used for generating the SPDET files.
SWF-D.OPERATIONS	A date and time stamp accompanied by a line of information on the state of the program or on task progress.

If either the WORK%SCHEDULE or the STATION%DATA file is missing, it is taken as a clue that the program is making a fresh start and needs initializing. If older, back-up versions of these files are manually reloaded, some care should be taken to avoid repeating already completed tasks.

The OPERATIONS log-file, on the other hand, though important to the human observer, is not vital to program operation: if it is missing, SWF-D will simply generate another one.

Prior to starting up the task-handlers, there is a programmed one-hour delay. This is to provide for manually resetting the program task queue, the station data, and/or other task-dependent data by means of the interrupt processing routines.

After checking working conditions (essentially a load average test), the program begins to cycle through the task queue. When each task-handler has completed a self-appointed quota, the task index is bumped so that the next time through the loop another task will be selected.

4.1.1 The Control-L Interrupt Processor

LoadWorkSchedule is the name of the routine which is the control-L interrupt processor; it is assembled as part of the main control module and can also be called as an internal subroutine to reload the parameterized operations control data. It maintains the SWF-D.WORK%SCHEDULE Tenex file and interactively creates a new file, if one does not exist, as part of the program initialization sequence.

This program provides for:

- programming the task queue,
- setting the load limit, and
- resetting the program's record of the last Event Summary File to be scanned.

The task queue is an interactively generated list of tasks which will be executed sequentially by the Main Control Module described above. See Appendix G for a description of the programmed operator functions, and Part G.4 in particular for a discussion of the control-L interactions.

It's expected that after an experimental service period, the task queue will settle into a more-or-less fixed list.

SWF-D is programmed throughout to check the operating-system load average and to suspend operation for a period if the load is greater than the externally-set parameter LoadLimit. The default LoadLimit value is 3.0 which permits a moderate amount of work to be performed even during the day except for peak load periods.

We've provided for manually resetting the date of the last Event Summary File to be scanned by the program in order to force re-scanning of old files. SWF-D was initialized to begin ESF checking on 1 January 1978.

4.1.2 The Control-S Interrupt Processor

SetStationData is the control-S interrupt processor; it is assembled as part of the main control module and can be called as an internal subroutine to reload the SRO station data. It maintains the SWF-D.STATION%DATA Tenex file and will create a new file as part of the program initialization sequence if one does not exist.

This program provides for:

- acquiring information by station about SRO data stored on the Datacomputer,
- printing current station data (i.e., station name, period of the data stored for the station on the Datacomputer (as advised by messages from ASL), and the date of the last short-period detections file generated for the station),
- updating the station data per ASL advice,
- adding a new station, and

. deleting a station.

If the Tenex file SWF-D.STATION%DATA exists, SetStationData will read it in to core and then interactively update the information in core and record it on the disk file. Otherwise, it will interactively construct the dataset and create a new file.

See Appendix G for a description of the programmed operator functions, and Part G.3 in particular for a discussion of the control-S interactions.

In addition to the individual SRO station data, this routine housekeeps two dates which pertain to the stations collectively: the AllStationsSPDETDate and the AllStationsASLDate. The former is a record of the date of the last short-period file (NSPF) scanned by SWF-D, and the latter is the universal date used for terminating the various task operations: ESF-scanning, waveform-copying and SPDET-mapping.

Ordinarily, only the ASL date will need to be changed on the basis of the periodic advice received from ASL. However, the SPDET date may also be changed to force the program to re-do portions of the SPDET files.

4.1.3 Recording Task Progress

The MARK routine is called upon to record task progress by the various task-handlers. It provides for updating either the STATION%DATA or the WORK%SCHEDULE file as directed by the input arguments.

Any problems in accessing these files at this point will cause SWF-D operations to halt in order to avoid running with possibly inconsistent task status information.

The SPDET-mapping routine (described in Section 4.4 below) uses MARK to record the date of the last short-period file it has scanned for detections. The ESF-checking routine (described in Section 4.2 below) uses MARK to record the date of the last Event Summary File it has scanned.

Each file is exactly one Tenex disk page (512 words) in length, and is updated by overwriting the old data.

4.1.4 Programmed Delays

A number of routines have been designed to enable SWF-D to voluntarily suspend operation either because of an intentionally programmed delay, or pending a change of state in the operating system or the Datacomputer. Three of these are described below.

The LIMBEAUX routine accepts as input the number of hours to delay program execution. It can be used very effectively when programming the task queue to schedule operations over a 24-hour period or longer.

The OKGoQ routine is called whenever it is feasible to wait for a low Tenex load average. The program will return to its caller immediately, and program execution will continue, if the load average is less than the programmed load-limit. Otherwise, it will wait and check the load average at two-minute intervals. The initial value of the parameter LoadLimit is 3.0; it may be reset interactively by typing control-L while the program is running. Appendix G explains how to do this.

The CheckL routine is called to check the 1-minute load average. It returns true|false to the caller according as the load average is below|above the pre-set maximum (the LoadLimit parameter).

4.1.5 The DCSTAT Interpreter

The CheckDC routine is used to check the status of the DC-203 Datacomputer operating on CCA-Tenex. It calls the DCSTAT program which is loaded dynamically during SWF-D program initialization, interprets the response, and returns true|false to its caller according as the Datacomputer is available or not.

The status information is passed between the two programs by means of a Tenex disk file. The file, named DCSTAT.OUT, is a one-page file which is overwritten with fresh DCSTAT output each time CheckDC is called.

The status data is checked, line by line. If the system is heavily or severely loaded, or important hardware is off-line, CheckDC returns an indication to its caller that it should wait for better operating conditions before proceeding, and records the reason on the Operations Log.

If there aren't any problems -- the usual case -- the routine reports, "OK to connect to Datacomputer" on the Operations Log and program execution continues.

Otherwise, the routine reports, "Not OK to connect to Datacomputer", on the Operations Log, along with the pertinent one of the reasons listed below:

-- Tenex load is too high.

-- Some hardware is off-line.

-- Datacomputer is not up.

-- TBM operations are suspended.

-- Datacomputer is going down soon.

-- DC job is not in NORMAL state.

-- Datacomputer is in NOT LISTENING state.

4.1.6 The RportL Routine

The RportL routine maintains a reliable record of SWF-D operations on the SWF-D.OPERATIONS Tenex file. The routine accepts an ASCII string which is passed to it by its caller, constructs a date/time-stamp, and appends the information to the log file. For example, each time the SWF-D program starts up, the current date, time and the message "new session" are logged.

SWF-D.OPERATIONS may be examined, listed, and then deleted as often as desired. New versions will be created automatically.

See Appendix F for samples of Operations Log messages which may appear in the course of running SWF-D.

4.2 The ESF-checking Module

The purpose of this component is to scan all entries in the Event Summary Files for 'requests' -- arrivals which have been flagged by a "T" in the WAVEFORMAVAIL field. (See Appendix B for a full description of the ESF.)

The output of this component is one or more Tenex disk files containing a list of the requests, and sufficient data to locate the associated waveform segments. These files are used later as input to the waveform-copying module.

A starting date of 1 January 1978 has been assembled into the program to mark it as the earliest ESF day file to be scanned. The program checks the daily ESF files sequentially in chronological order, accumulating the requests, and periodically recording the limit of the search it has done. The limit of the search is recorded as the name of the last ESF file examined. Each of these filenames contains the date its data applies to. (See Appendix B.)

The following information is retrieved from the ESF for each request: the event number assigned by NEP, the station-site identifier, phase name, channel name and type, component, rate, gain, amplitude, and the data segment start date/time field. In addition, file position information (the EINDEX and AINDEX fields) and the waveform designation stored in the phase-array date/time fields is retrieved. For the precise Datalanguage definition of the REQ PORT which is used to retrieve these fields, see Appendix A.

4.2.1 The GetEvents Routine

The GetEvents routine is an important part of the ESF-checking module. When called with the appropriate Datacomputer connections established, it sends the Datalanguage for retrieving the requests from an ESF file and to write them onto a local Tenex file.

A local file is created to correspond to each daily ESF file which contains any requests. The length of the file is proportional to the number of requests: 19 36-bit words/request. These files will be read later by the waveform-copying module.

The Tenex filename is keyed to the relevant Datacomputer ESF filename by means of the Tenex filename-extension field. For the Datacomputer ESF filename:

"%TOP.SDAC.VELANET.PESF.Ynnnn.Mnn.Dnn",

the corresponding local filename is:

"ARRIVALS.Ynnnn%Mnn%Dnn".

As an example, for the 2 July 1978 ESF file, the Tenex filename is "ARRIVALS.Y1978%M07%D02".

A sample script of a recent Datacomputer session which shows the ESF-checking operation is given in Appendix D.1. The corresponding Datalanguage that GetEvents transmits is listed in Appendix C.1.

4.3 The Waveform-copying Module

This component works from the input list prepared by the ESF-checking component to locate and append the selected seismic data to the Signal Waveform File.

The program checks for input in local Tenex files which are named ARRIVALS, and which are keyed to events on a particular date by means of the Tenex extension-field name. These files are used for creating 'driver-files' -- specially packed local Tenex files designed to be read through a Datacomputer PORT to supply the parameters used in the Datalanguage requests which cause the waveform segments to be copied from one Datacomputer file to another.

Up until this point, there has been no conceptual difference in the handling of long-period vs short-period files. Now, however, because of data-dependent variations in the file descriptions, the Datalanguage requests are slightly different -- and, consequently, there are separate input driver-files for each type of data.

The long-period driver-file is named LP-ARRIVALS, with the extension field used, as for the ARRIVALS files to designate a particular date. Similarly, the short-period driver-files are named SP-ARRIVALS.

Each type of Datalanguage request uses one Datacomputer PORT and three FILEs as well as the pertinent local Tenex file. The request has two distinct parts to it: one to copy the data from the non-array SRO file over to the SWF, and the other to update the ESF. The effect of the Datalanguage request is to cause the update to the ESF and the append to the SWF to happen simultaneously.

The update of the ESF and the append to the SWF are done together to ensure that the ESF and the SWF files will remain in synchrony. If the request should fail to run to completion, both parts of the request will fail.

The Datalanguage sent by the program is listed in Appendix C, and a script of a Datacomputer session showing the copying in progress is given in Appendix D.

4.3.1 The CRInput Routine

The CRInput routine is assembled as part of the waveform-copying module. It, in turn, calls upon internal subroutines to create the long-period and short-period input driver-files. Each subroutine reads the list of copy-requests filed on the local ARRIVALS files which were created by the ESF-checking module, and produces the corresponding LP-ARRIVALS and SP-ARRIVALS files in local storage space.

For each request, the program computes a window based upon the input date and time information to establish a timeframe within which it will attempt to locate the segment of long-period and short-period data which represent the desired waveform. The special ESF fields used for this purpose are described as part of the Req PORT definition in Appendix A, Section 1.

The information in each request is tested for reasonableness to the extent possible. Non-numeric data in a request's time field is an example of one type of error that can be caught.

Also, the name of the station, as it appears in the request, is checked against the program's list of known SRO stations. If the station cannot be identified, the program makes a note of it on the Operations Log and ignores the request.

The request from the ARRIVALS file is read into a buffer in core which can be referenced by the BCPL Req structure. The output to the LP-ARRIVALS and SP-ARRIVALS files is prepared in buffers which are accessed via the PutS and PutL BCPL structures. Routines to output the contents of these buffers for debugging and checking purposes are described in Section 4.5 below.

The subroutine which prepares the long-period input driver-file determines data availability by checking whether the date of the requested segment is earlier than the ASL-supplied date. The subroutine which handles short-period input must, in addition, further determine data availability by checking the appropriate SPDET file. The SPThere subroutine described below is used for this purpose.

4.3.2 The SPThere Routine

The SPThere routine is assembled as part of the waveform-copying module. It is used to test whether a requested short-period data segment falls within the time-bounds of any of the detections recorded in the SPDET files stored on the Datacomputer.

The composition of these files is described in greater detail below in Section 4.4, the Datalanguage FILE description is listed in Appendix B, PORTs for viewing selected portions of the file are listed in Appendix A, and, of particular interest, a list of the test-related SPDET entries is given in Appendix E, Part 2.

SPDET-file entries are read into a core buffer and the start/stop times of each detection are compared to the arrival time noted in the request.

The computed window will be adjusted to match the available data as necessary, either by expanding it to encompass the entire detected segment or by truncating it to fit. The immediately preceding and following segments which are adjacent in time will also be copied.

4.4 The SPDET-mapping Module

This module constructs and maintains a table of all the data segment start/stop times for the short-period SRO detections recorded and filed on the Datacomputer. We've referred to it in this document as the SPDET map.

The waveform-copying module uses this information to determine whether requested waveforms may be expected to be available. The map is constructed by successively scanning each daily SRO-produced non-array short-period file (NSPF description in Appendix B), extracting a basic set of information about each marked detection, and then outputting the list as a series of monthly Datacomputer files under the %TOP.SDAC.VELANET.SPDET node, with the year and month used as pathname keys to the period covered. The complete pathname has the form:

%TOP.SDAC.VELANET.SPDET.Ynnnn.Mnn,

and the first file generated was for January, 1978:

%TOP.SDAC.VELANET.SPDET.Y1978.M01.

The date of the last short-period file that was examined by the program is stored in the AllStationsSPDETDate parameter in the local WORK%SCHEDULE file. New monthly files are created when timely.

The Datalanguage used by the program to extract the detection times is shown in Appendix C, Section 4, and a script of a representative session is given in Appendix D, Section 3. The SPDET map for the period 1-3 July 1978 is listed in Appendix E, Section 2.

4.5 The Utilities Programs Module

This component is effectively a package of utility and debugging display subroutines which can be called by any of the components as well as from the top-level SWF-Demon Main Control Module.

Two routines serve to transform time-codes. One routine converts time in the format HHMMSSCC from a string of ASCII-encoded digits into a binary integer value. It also checks for valid numeric data and will report errors on the SWF-D Operations Log.

The inverse routine converts an integer into an ASCII string. It interprets the input value as a number of hours, minutes, seconds or centiseconds as instructed by an input code.

Included here also are the display routines which, when called, output the contents of the various BCPL structures used by the program, as follows:

Routine	BCPL Structure	Contents
PrReq	Req	waveform-copy request
PrPutL	PutL	long-period driver-file input buffer
PrPutS	PutS	short-period driver-file input buffer

5. Test Procedures

This section describes the procedures that have been devised for testing each of the SWF-D program's task-handling modules discussed above in Section 4. Because of the program's modularity, each task-handler could be tested individually and, when running error-free, could be scheduled for regular operation in detached background mode.

The ESF-checking Module, described first below, is one of the task-handlers which has already been placed in service. The Waveform-copying Module, described next, has been operated in debugging mode only and will need further testing. The SPDET-mapping Module, described last in this section, is another task-handler which is operated on a regular basis.

5.1 For the ESF-checking Module

Because there have not yet been any flagged arrivals in the regular stream of Event Summary Files entries, a test ESF file was created in the SWF-D program's work area on the Datacomputer using the RDC program [CCA g]. For debugging purposes, we copied the ESF file for 26 May 1978, which has the Datacomputer pathname "%TOP.SDAC.VELANET.PESF.Y1978.M05.D26", over to a file with pathname "%TOP.SDAC.CCA.SWF.ESF%UNINVERTED", and flagged a handful of arrivals by writing a "T" in several WAVEFORMAVAIL fields.

The significance of these CCA-flagged arrivals, and whether or not they were associated with interesting events, or even whether there were related seismic readings in the raw data files was not known -- nor was it considered important insofar as the test was concerned. The module makes no value judgments regarding the pre-defined set of information it retrieves from an ESF file.

Once we had gained some confidence in the workings of this module, we scheduled it to check the ESF entries beginning with 1 January 1978. This exercise has proceeded without finding any flagged arrivals through 25 July 1978.

The progress of the module through the ESF entries is recorded on the SWF-D Operations Log. (An excerpt from the Log is listed in Appendix F.) Each time it is called from the Main Control Module, if there is work to do, the ESF-checking module outputs the phrase "Scanning for arrivals", followed by a note of which ESF file it will begin scanning and the number of files to be scanned. When the checking session ends, it reports on whether it found any flagged arrivals. If the ESF-checking is up-to-date, the module reports that fact and returns immediately to its caller.

5.2 For the Waveform-copying Module

This is the module which constructs and sends the Datalanguage for copying waveform segments from the SRO non-array data files (NLPF and NSPF) to the SWF, as directed by the content of the flagged entries in the ESF. It also posts the results of its work back in the ESF.

Because the burden of the SWF-D program's activities is borne by the Waveform-copying Module, it needs to be subjected to the most thorough testing. The debugging procedure relies upon a set of utility print routines (described above in Section 4) which are used in combination with independent checking by means of the RDC program.

To aid us in verifying that the copy-request parameters were being processed correctly, we provided routines which, when called, would print out the values of specific BCPL data structures at strategic points in the execution process. Included as examples here below are prints of the "Req" and "PutL" structures which were copied from the script-files of recent debugging sessions.

. Req - contains the copy-request parameters which were read from a Datacomputer ESF file and written on a Tenex ARRIVALS file.

```
Req --
EINDEX = 1
EVENTNUM = 781469658
AINDEX = 1
STA = GUMO
CHANTYPE =
RATE = 10
CHANID =
GAIN = U
COMP = Z
DSDATE = 60
DSTIME = 07070707
PADATE = 078146
PATIME = 23180610
PHASEID = P
AMP = 240
```

The values shown for the DSDATE, DSTIME and AMP fields were written on the ESF using the RDC program.

. PutL - contains the request parameters in the form they will be supplied to the Datacomputer for driving the Datalanguage copy request.

```
PutL --
EsfCount = 1
EINDEX = 1
AINDEX = 1
DSDATE = 078146
DSTIME = 01354010
SwfCount = 1
EVDATE = 78146
EVNUM = 9658
STA = GUMO
CHANTYPE =
RATE = 10
CHANID =
GAIN = U
COMP = Z
DSDATE = 078146
DSTIME = 01354010
SCALEFACTOR = 00341903
STANAME = GUMO
STARTI = 95
ENDI = 1399
TYP = 1
```

Thus far, this module has been tested on the data for the 26th of May, which SDAC advised would contain interesting seismic events even though the arrivals were not flagged in the ESF. The module was executed with debug printouts, as shown, and then the same file-to-file copying was done manually, using the RDC program to supply the Datalanguage.

The results were compared, and showed that the program had moved the same data as had the operator when running RDC. This implies that the program behaves correctly - with good data - at least to the extent that single blocks of data were copied, and the ESF updated appropriately.

We now have SDAC-flagged arrivals and associated SRO data on Datacomputer files for the 2nd of July (on display in Appendix E). With this valid data on hand, we will perform further testing for bad-data protection and for correct handling of massive data using the techniques and tools described in this section.

5.3 For the SPDET-mapping Module

The SPDET map is derived directly from the SRO non-array short-period files. It is a list of all the detections, in the order in which they appear on the files, divided into a series of monthly Datacomputer files. (The map for 1-3 July 1978 is shown in Appendix E.)

The SPDET map for the first few months of 1978 was originally generated by Lincoln Laboratories, Applied Seismology Group, for their own use. It was felt that having the CCA program generate files for the same period and then comparing the results would be a sufficient test of correct operation.

This module is now used on a regular basis to generate SPDET files; it has worked its way through the set of NSPF files beginning with the data for 1 January 1978, and has recently reached 25 July 1978.

Progress through the NSPF data is recorded on the SWF-D Operations Log. When called from the Main Control Module, if there is work to do, the SPDET-mapping module outputs the phrase "Generating segment availability map", followed by a note of which NSPF file it will begin reading and the number of files to be read. If the SPDET files are up-to-date, the module reports that fact and returns immediately to its caller.

A. Datacomputer PORT Definitions

A.1 Req: the Request PORT

The Req PORT is designed for extracting the basic set of information needed from the Preliminary Event Summary File (PESF) in order to identify which waveform segments are to be copied. To that end, many of the PORT field names correspond to those found in the definition of the PESF (See Appendix B, Section 1).

However, a number of the fields have been adapted to special purposes -- mainly to transfer data across the various files which would otherwise have to be done, perhaps awkwardly or less efficiently, as a separate operation by SDAC. These fields are listed below along with an explanation of how they are used.

Field	Purpose
DATASEGSTART.DATE	SDAC stores the amount, in seconds, by which the left edge of the waveform segment window should precede the arrival time.
DATASEGSTART.TIME	Temporary holding place for the SRO scale factor. It will be copied into the PSWF (See B.4.) DATASEGMENT.SCALEFACTOR field.
PHASEARR.DATE	This information is copied into the PSWF DATASEGMENT.START.DATE field.
PHASEARR.TIME	This field is used to transmit the arrival time of the candidate waveform segment.
AMP	SDAC stores here the number of seconds to add to the arrival time to determine the right edge of the desired window.

The SWF-D ESF-checking module reads ESF data though the Req PORT into core and then writes it out onto a local Tenex file.

Datacomputer pathname: %TOP.SDAC.CCA.SWF.REQ

Datalanguage description:

```
CREATE REQ PORT LIST (,9999),P=EOF,B=36
        REQUEST STRUCT
                EINDEX BYTE     /*EVENT*/
                EVENTNUM STR(9),B=9
                AINDEX BYTE     /*ARRIVAL*/
                STA STR(5),B=9
                CHANTYPE STR(1),B=9
                RATE STR(2),B=9
                CHANID STR(4),B=9
                GAIN STR(1),B=9
                COMP STR(1),B=9
                DATASEGSTART STRUCT
                        DATE INT(6),B=9
                        TIME INT(8),B=9
                END /*DATASEGSTART*/
                PHASEARR STRUCT
                        DATE INT(6),B=9
                        TIME INT(8),B=9
                END /*PHASEARR*/
                PHASEID STR(6),B=9
                AMP INT(7),B=9
        END /*REQUEST*/;
```

A.2 PUTL: The PUT Long-period data PORT

The PUTL PORT is used by the SWF-D program waveform-copying module for effecting the copy of long-period data from the Non-array Long-Period Files (NLPF) over to the Preliminary Signal Waveform Files (PSWF), for recording the PSWF status in the Preliminary Event Summary Files (PESF), and for filling various file fields as instructed by SDAC. (See Appendix B for FILE definitions.)

In order to maintain the synchrony between the PSWF and the PESF, the PORT provides for concomitant PESF updating. Thus, if the Datalanguage request (Appendix C, Section 2) should fail to run to completion, the PESF records will not be left with contradictory status information.

Because the input stream through the PORT is packed to match its description, any Datacomputer messages which indicate a possible mismatch between the data and the container descriptions will need to be investigated by the program maintainer.

Datacomputer pathname: %TOP.SDAC.CCA.SWF.PUTL

Datalanguage description:

```
CREATE PUTL PORT STRUCT,P=EOF
        ESFPUT LIST(1,999),B=36,C=1
                ESFITEM STRUCT
                        EINDEX BYTE
                        AINDEX BYTE
                        DATASEGSTART STRUCT
                                DATE INT(6),B=9
                                TIME INT(8),B=9
                        END /*DATASEGSTART*/
                END /*ESFITEM*/
        SWFPUT LIST(,999),B=36,C=1
                SWFITEM STRUCT
                        EVENTID STRUCT
                                EVDATE INT(5),B=9
                                EVNUM INT(4),B=9
                        END /*EVENTID*/
                        STA STR(5),B=9
                        CHANTYPE STR(1),B=9
                        RATE STR(2),B=9
                        CHANID STR(4),B=9
                        GAIN STR(1),B=9
                        COMP STR(1),B=9
                        DATASEGMENT STRUCT
                            START STRUCT
                                DATE INT(6),B=9
                                TIME INT(8),B=9
                            END /*START*/
                            SCALEFACTOR INT(8),B=9
                            STA STR(5),B=9 /*STATION NAME*/
                            STARTI BYTE /*DATA START INDEX*/
                            ENDI BYTE /*DATA END*/
                            TYP BYTE /*V,N,E*/
                        END /*DATASEGMENT*/
                END /*SWFITEM*/
        END /*PUTL*/;
```

A.3 PUTS: The PUT Short-period data PORT

The PUTS PORT is used by the SWF-D program waveform-copying module for effecting the copy of short-period data from the Non-array Short-Period Files (NSPF) into the Preliminary Signal Waveform Files (PSWF), for recording the PSWF status in the Preliminary Event Summary Files (PESF), and for filling various file fields as instructed by SDAC. (See Appendix B for FILE definitions.)

The layout of the PORT and its purposes are exactly analogous to those of the PUTL PORT described above (A.2.) but with adjustments made to compensate for the differences between the storage characteristics of long-period and short-period data.

Datacomputer pathname: %TOP.SDAC.CCA.SWF.PUTS

Datalanguage description:

```
CREATE PUTS PORT STRUCT,P=EOF
        ESFPUT LIST(1,999),B=36,C=1
                ESFITEM STRUCT
                        EINDEX BYTE
                        AINDEX BYTE
                        DATASEGSTART STRUCT
                                DATE INT(6),B=9
                                TIME INT(8),B=9
                        END /*DATASEGSTART*/
                END /*ESFITEM*/
        SWFPUT LIST(,999),B=36,C=1
                SWFITEM STRUCT
                        EVENTID STRUCT
                                EVDATE INT(5),B=9
                                EVNUM INT(4),B=9
                        END /*EVENTID*/
                        STA STR(5),B=9
                        CHANTYPE STR(1),B=9
                        RATE STR(2),B=9
                        CHANID STR(4),B=9
                        GAIN STR(1),B=9
                        COMP STR(1),B=9
                        DATASEGMENT STRUCT
                            START STRUCT
                                DATE INT(6),B=9
                                TIME INT(8),B=9
                            END /*START*/
                            SCALEFACTOR INT(8),B=9
                            STINDEX BYTE
                                /*STAT<ION ENTRY INDEX*/
                            DSDATE INT(6),B=9
                            DSTIME INT(8),B=9
                            DETIME INT(8),B=9
                        END /*DATASEGMENT*/
                END /*SWFITEM*/
        END /*PUTS*/;
```

A.4 SSPDET: The Simple Short-Period DETections PORT

The SSPDET PORT was created for the purpose of extracting only the station-index and the detection start and end times from a monthly SPDET file of all short-period detections. (See Appendix B, Section 5 for a description of the SPDET file.)

The program uses this information (1) to determine whether a short-period waveform segment exists for a flagged arrival; and, if so, (2) to adjust the window by (a) expanding it to include an adjacent related segment, or (b) truncating it to conform to the recorded detection.

Datacomputer pathname: %TOP.SDAC.CCA.SWF.SSPDET

Datalanguage description:

```
CREATE SSPDET PORT LIST(0,2500,35000),P=EOF,B=36
DETECTION STRUCT
        STANDEX BYTE
        STIME STR(8),B=9
        ETIME STR(8),B=9
 END;
```

A.5 Two ASCII Short-Period DETections PORTs

ASCII PORTs have been defined as a means for conveniently viewing, at a terminal, portions of the monthly collection of short-period detections in the SPDET files (see Appendix B, Section 5). Two PORTs are listed below, but it is clear that the basic definition could be tailored to suit any specific application. Sample output through the ASPDET PORT is listed in Appendix E, Section 2.

Datacomputer pathname: %TOP.SDAC.VELANET.PORTS.ASPDET

Datalanguage description:

```
CREATE ASPDET PORT LIST(0,2500,35000),P=EOF
 DETECTION STRUCT,P=EOR
        INDEX STR(5),D=' '
        STANDEX STR(2),D=' '
        STA STR(5),D=' '
        SDATE STR(6),D=' '
        STIME STR(8),D=' '
        EDATE STR(6),D=' '
        ETIME STR(8),D=' '
  END;
```

The ASPDETALL PORT is the extreme expanded form in that it includes a representation for each type of SPDET file data that is stored or that can be generated by the Datacomputer.

Datacomputer pathname: %TOP.SDAC.VELANET.PORTS.ASPDETALL

Datalanguage description:

```
CREATE ASPDETALL PORT LIST(0,2500,35000),P=EOF
 DETECTION STRUCT,P=EOR
        INDEX STR(5),D=' '
        STANDEX STR(2),D=' '
        STA STR(5),D=' '
        SINDEX STR(5),D=' '
        SDATE STR(6),D=' '
        STIME STR(8),D=' '
        EINDEX STR(5),D=' '
        EDATE STR(6),D=' '
        ETIME STR(8),D=' '
 END;
```

A.6 AOUT: The Arrivals OUTput PORT

The AOUT PORT definition is included here for completeness. It is not used by the SWF-D program per se, but rather may be used manually while running the RDC program to read selected arrivals from ESF files for debugging purposes or to cross-check program operation.

The reader is referred to the VELA Network Mass Store Data Retrieval Guide [TELEDYNE a] for a full description of each field's composition and purpose.

A listing of the test-related arrivals, output through the AOUT PORT is included below in Appendix E, Section 1.

Datacomputer pathname: %TOP.SDAC.VELANET.PORTS.PESF.AOUT

Datalanguage description:

```
CREATE AOUT PORT LIST (,1000),P=EOF
 EVENT STRUCT,P=EOR
       EVENTNUM STR(9),D=' '
       ORIGIN STRUCT
              DATE INT(6),D=' '
              TIME INT(8),
       END
       STANDEVORIGT INT(4),D=' '
       NSTA INT(3),D=' '
       HYPOCENTER STRUCT
              COMPSOURCE STR(1),D=' '
              EPICENTERCOMP STR(1),D=' '
              LATITUDE STRUCT
                     LAT INT(5),D=' '
                     HEM STR(1),D=' '
              END
              LONGITUDE STRUCT
                     LONG INT(6),D=' '
                     HEM STR(1),D=' '
              END
              NSTA INT(3),D=' '
              DEPTH STRUCT
                     DEPTH INT(3),D=' '
                     STANDEV INT(3),D=' '
                     METHOD STR(1),D=' '
              END
              CONFIDREGION STRUCT
                     SMAJORAXIS INT(5),D=' '
                     SMINORAXIS INT(5),D=' '
                     ANGLE INT(4),D=' '
              END
              REGION STRUCT
                     GEOCODE STR(3),D=' '
                     SEISNUM STR(3),D=' '
              END
              BODYWAVE STRUCT,P=EOR
                     MBMAG INT(3),D=' '
                     STANDEV INT(3),D=' '
                     NSTA INT(2),D=' '
              END
              SURFACEWAVE STRUCT
                     MSMAG INT(3),D=' '
                     STANDEV INT(3),D=' '
                     NSTA INT(2),D=' '
```

```
                END
                LOCALMAGNITUDE STRUCT
                        MLMAG INT(3),D=' '
                        SOURCE STR(3),D=' '
                END
                        PARAM STR(20),D=' '
                NPHASE INT(3),D=' '
                NARR INT(3),P=EOR
                ARRIVALS LIST (,500),D=')'
                        ARRIVAL STRUCT,P=EOR
                                STA STR(5),D=' '
                                CHANTYPE STR(1),D=' '
                                RATE INT(2),D=' '
                                CHANID STR(4),D=' '
                                GAIN STR(1),D=' '
                                COMP STR(1),D=' '
                                ASSOCCONF STR(1),D=' '
                                DIST INT(4),D=' '
                                AZ INT(4),D=' '
                                DATASEGSTART STRUCT
                                        DATE INT(6),D=' '
                                        TIME INT(8),D=' '
                                END
                                PHASEARR STRUCT
                                        DATE INT(6),D=' '
                                        TIME INT(8),D=' '
                                END
                                PHASEID STR(6),D=' '
                                PHASENUM INT(2),D=' '
                                PHASECODE STR(2),D=' '
                                AMP INT(7),D=' '
                                PER INT(3),D=' '
                                RES INT(5),D=' '
                                USAGE STRUCT
                                        LOCATION STR(1),D=' '
                                        MBUSE STR(1),D=' '
                                        MSUSE STR(1),D=' '
                                END
                                WAVEFORMAVAIL STR(1),D=' '
                        END
                END
END;
```

B. Datacomputer FILE Definitions

B.1 The ESF: Event Summary File

Datacomputer pathname: %TOP.SDAC.VELANET.PESF.Yyyyy.Mmm.Ddd

E.g., for 2 July 1978: %TOP.SDAC.VELANET.PESF.Y1978.M07.D02

The Event Summary File (ESF) is the most complex of the Datacomputer files involved. It consists of a list of events with many parameters associated with each event. Each event also has an inner list of arrivals associated with it. Each "arrival" represents an actual or predicted arrival of a seismic wave front at a station. There are a variable number of arrivals per event and a variable number of events per day file. All of the entries in the ESF are created by the Seismic Data Analysis Center, Alexandria, Virginia.

Each completed arrival entry contains enough information to locate the actual waveform data, if present, in either a raw data file -- that is, the non-array long-period files (NLPF) and the non-array short-period files (NSPF) -- or the Signal Waveform File (SWF) for that day.

The WAVEFORMAVAIL field for each arrival is used by SDAC to mark the presence or absence of the waveform data, or to mark the arrival as a request for the SWF-D program to copy the waveform data over to the SWF. It is encoded as follows:

"Y" or "C" if some waveform data for the arrival exists on the SWF;

"N" if it does not; and

"T" if this is a request for CCA to copy waveform data to the SWF.

The SWF-D program will ultimately change any "T" to a "Y" or "N" as appropriate and in the case of a "Y", meaning success in locating and copying the requested waveform data, will also set various fields as directed by SDAC.

Datalanguage description:

```
CREATE PESF.Yyyyy.Mmm.Ddd FILE LIST (10,50,300),B=32
EVENT STRUCT,B=32
        EINDEX BYTE,V=I
        EVENTNUM STR(9),B=8
        ORIGIN STRUCT
                DATE INT(6),B=8,I=D      /* 0YYDDD */
                TIME INT(8),B=8  END     /* HHMMSSCC */
        STANDEVORIGT INT(4),B=8
        NSTA INT(3),B=8
        HYPOCENTER STRUCT
                COMPSOURCE STR(1),B=8,I=D
                EPICENTERCOMP STR(1),B=8,I=D
                LATITUDE STRUCT
                        LAT INT(5),B=8
                                /* XX.XXX DEGREES */
                        HEM STR(1),B=8,I=D  END
                LONGITUDE STRUCT
                        LONG INT(6),B=8
                                /* XXX.XXX DEGREES */
                        HEM STR(1),B=8,I=D  END
                NSTA INT(3),B=8,I=D
                DEPTH STRUCT
                        DEPTH INT(3),B=8   /* XXX KM */
                        STANDEV INT(3),B=8  /* XXX KM */
                        METHOD STR(1),B=8  END
                CONFIDREGION STRUCT
                        SMAJORAXIS INT(5),B=8
                           /* XXXX.X KM */
                        SMINORAXIS INT(5),B=8
                                /* XXXX.X KM */
                        ANGLE INT(4),B=8  END
                                /* XXX.X DEGREES */
                REGION STRUCT
                        GEOCODE STR(3),B=8,I=D
                        SEISNUM STR(2),B=8,I=D  END
                BODYWAVE STRUCT
                        MBMAG INT(3),B=8   /* X.XX */
                        STANDEV INT(3),B=8
                        NSTA INT(3),B=8  END
                SURFACEWAVE STRUCT
                        MSMAG INT(3),B=8  /* X.XX */
                        STANDEV INT(3),B=8
                        NSTA INT(3),B=8  END
```

```
LOCALMAGNITUDE STRUCT
                MLMAG INT(3),B=8
                SOURCE STR(1),B=8
        END
        PARAM STR(20),B=8
        NPHASE INT(3),B=8
        NARR INT(3),B=8
        ARRIVALS LIST (,500,999),C=NARR
                ARRIVAL STRUCT
                        AINDEX BYTE,V=I
                        STA STR(5),B=8,I=I
                        CHANTYPE STR(1),B=8
                        RATE INT(2),B=8,I=I
                        CHANID STR(4),B=8,I=I
                        GAIN STR(1),B=8,I=I
                        COMP STR(1),B=8,I=I
                        ASSOCCONF STR(1),B=8,I=I
                        DIST INT(4),B=8
                                /* XXX.X DEGREES */
                        AZ INT(4),B=8
                           /* STA TO EPI XXX.X DEGREES */
                        DATASEGSTART STRUCT
                                DATE INT(6),B=8
                                TIME INT(8),B=8
                        END
                        PHASEARR STRUCT
                                DATE INT(6),B=8,I=I
                                TIME INT(8),B=8
                END
                PHASEID STR(6),B=8,I=I
                PHASENUM INT(2),B=8
                PHASECODE STR(2),B=8,I=I
                AMP INT(7),B=8
                        /* XXXXXX.X NM PK - PK */
                PER INT(3),B=8 /*XX.X SECONDS*/
                RES INT(5),B=8 /*XX.XX SECONDS*/
                USAGE STRUCT
                        LOCATION STR(1),B=8,I=I
                        MBUSE STR(1),B=8,I=I
                        MSUSE STR(1),B=8,I=I
                END
                WAVEFORMAVAIL STR(1),B=8
                END
        END
END;
```

B.2 The NLPF: Non-array Long-period File

Datacomputer pathname: %TOP.SDAC.VELANET.NLPF.Yyyyy.Mmm.Ddd

E.g., for 2 July 1978: %TOP.SDAC.VELANET.NLPF.Y1978.M07.D02

The non-array long-period files (NLPF) are the raw data files in which the SWF-D program will attempt to locate the SDAC-requested long-period waveform segments. The data, consisting of one sample per second, are recorded and, after ASL review, are stored continuously by SRO site on Datacomputer files.

Each NLPF file contains data readings for a single day, as is indicated by its Datacomputer pathname. The SWF-D Waveform-copying Module, described above in Section 4, appends portions of NLPF-data to the SWF file of the corresponding day.

Datalanguage description:

```
CREATE NLPF.Yyyyy.Mmm.Ddd FILE
   LIST(0,3,16),B=32,IA=32,ID=1,II=0 /* size for now is 16 */
       STATION STRUCT,B=32 /* ONE LIST FOR EACH SITE *
           STA STR(5),B=8,I=D /* station id */
           FLAG INT,VE=0
           FILLER BYTE,B=24 /* FILLER */
           STINDEX BYTE,V=I
           DATA LIST(1440)  /* # of minutes per day */
               SAMPLES STRUCT,B=32 /* one minute of data */
                   INDEX BYTE,V=I
                   DATE INT(6),B=8  /* 0yyddd */
                   TIME INT(8),B=8  /* hhmmsscc */
                   PAD BYTE,B=8  /* force 24/32 bit boundary */
                   V INT,VE=1 N INT,VE=2 E INT,VE=3
                       /* use with "type" below */
                   BLOCK STRUCT,B=8 /* Albuquerque supplies */
                       ABSENT BYTE,B=3 /* 1=data absent */
                       OP LIST(3)
                           ERR STRUCT
                               TYPE BYTE,V=I /* v,n,e components */
                               BIT BYTE,B=1 /* 1=operator declared bad */
                           END
                       FILL BYTE,B=2 /* 2 filler bits, undefined */
                   END
                   TIMESERIES LIST(180),B=32
                      SECOND STRUCT
                        SINDEX BYTE,V=I
                        SEC INT,VE=1+(SINDEX-1)/3
                        TYPE INT,VE=SINDEX-((SINDEX-1)/3)*3 /*V,N,E  */
                        DATUM BYTE,B=16
                      END
               END
       END;
```

B.3 The NSPF: Non-array Short-period File

Datacomputer pathname: %TOP.SDAC.VELANET.NSPF.Yyyyy.Mmm.Ddd

E.g., for 2 July 1978: %TOP.SDAC.VELANET.NSPF.Y1978.M07.D02

The non-array short-period files (NSPF) are the raw data files in which the SWF-D program will attempt to locate the SDAC-requested short-period waveform segments. The data, consisting of 10 samples per second, are recorded and, after ASL review to factor out noise, calibration readings, and the like (as noted in Appendix H), are stored on Datacomputer files.

Each NSPF file contains the data readings for a sirgle day, as is indicated by its Datacomputer pathname. The SWF-D Waveform-copying Module, described above in Section 4, appends portions of NSPF-data to the SWF file of the corresponding day.

Datalanguage description:

```
CREATE NSPF.Yyyyy.Mmm.Ddd FILE /* segmented once per day */
    LIST(0,10,32),B=32,BI=25,IA=56,ID=10,II=0  /* size for now IS 10 */
                    /* up to 32 pieces of days */
        STATION STRUCT,B=32 /* one list for each OF 10 sites */
            STA STR(5),B=8,I=D /* station id */
            STINDEX BYTE,V=I
            COUNT BYTE,B=24  /* count of seconds stored */
            FLAG INT(1),B=8,I=D /* NON-ZERO IF FIRST OF 2 PARTS */
            FILLER BYTE,B=24 /* FILLER */
            DATA LIST(,6700,86400),C=COUNT  /* 6700 SECONDS FOR NOW */
                SAMPLES STRUCT /* once per second */
                    INDEX BYTE,V=I
                    DATE INT(6),B=8  /* 0yyddd */
                    TIME INT(8),B=8  /* hhmmsscc */
                    PAD BYTE,B=8  /* force 24/32 bit boundary */
                    BLOCK STRUCT,B=8 /* Albuquerque supplies */
                        ABSENT BYTE,B=3  /* 1=data absent */
                        OPERR BYTE,B=1  /* 1=operator declared channel bad */
                        DET BYTE,B=1  /* 1 for first second of detection */
                        FILL BYTE,B=3  /* 3 filler bits, undefined */
                    END
                    TIMESERIES LIST(20),B=32
                        DATUM BYTE,B=16 /* gain-ranged format */
                END
        END;
```

B.4 The SWF: Signal Waveform File

Datacomputer pathname: %TOP.SDAC.VELANET.PSWF.Yyyyy.Mmm.Ddd

E.g., for 2 July 1978: %TOP.SDAC.VELANET.PSWF.Y1978.M07.D02

The Signal Waveform Files (SWF) are a collection of the most interesting sections of seismic data extracted from the raw seismic waveform information. These files will contain only those readings which relate directly to the detected seismic events in the Event Summary Files (ESF), or to noteworthy unassociated seismic arrivals.

Both SDAC and the CCA SWF-D program (as directed by SDAC) append waveform segments to the SWF. The Waveform-copying Module described in Section 4 above, copies data from the NSPF and NLPF files over to the corresponding SWF files.

The SWF status is reflected by entries in the ESF which are created by SDAC, and updated by both SDAC and SWF-D.

Datalanguage description:

```
CREATE PSWF.Yyyyy.Mmm.Ddd FILE          /* SEGMENTED DAILY */
       LIST (50,200,2200) ,B=32
            /* 50 DETECTIONS PER DAY * 2 ARRIVALS/SITE * 22 SITES */
            SIGNAL STRUCT               /* ONE PER SITE PER PHASE */
                   ARRIVAL STRUCT
                           EVENTID STRUCT     /*EVENT IDENTIFIER*/
                                 EVDATE INT(5),B=8    /*YYDDD */
                                 EVNUM INT(4),B=8   /* NUMBER */
                           EVENTNUM STR(9),VE=EVDATE!EVNUM
                            END
                           INDEX BYTE,V=I
                           STA STR(5),B=8,I=D          /* STATION */
                           CHANTYPE STR(1),B=8
                                  /* A,B,S,I=ADAPTIVE BEAM,BEAM,SUBARRAY BEAM,
                                  INDIVIDUAL INSTRUMENT */
                           RATE INT(2),B=8
                           CHANID STR(4),B=8,I=D
                                  /* BBUU FOR INFINITE VELOCITY BEAMS */
                           GAIN STR(1),B=8  /* H,L */
                           COMP STR(1),B=8
                                  /* Z,N,E,T,R,1,2,3 NUMERICS FOR ALPA */
                           BEAMAZ INT(5),B=8
                                  /*  0-360 DEGREES: XXX.XX DEGREES */
                           BEAMVEL INT(5),B=8     /* XXX.XX DM/SEC */
                           DETECTCONF STR(1),B=8
                                  /* A,B,C, = SIGNAL, S/N ABOUT 1, S/N LESS THAN 1
                                  AND SIGNAL SUSPECT; ANALYST SAYS */
                           CLIPPED STR(1),B=8 /* Y,N, ANALYST SAYS */
                           ARVLPAD STR(1),B=8 /* PAD BYTE */
                   END
```

```
DATASEGMENT STRUCT
        START STRUCT
                DATE INT(6),B=8          /* OYYDDD */
                TIME INT(8),B=8          /* HHMMSSCC */
        END
        NSAMP INT(4),B=8
                /* DATA SAMPLES IN DATASEGMENT */
        DATAFORMAT STR(1),B=8
                /* I,G: INTEGER, GAINRANGED */
        SCALEFACTOR INT(8),B=8
                /* XXX.XXXXX NANOMETERS PER LEAST SIGNIFICANT BIT */
        DATAPAD STR(1),B=8
        TIMESERIES LIST(,1600),B=16,C=NSAMP
                DATA STRUCT
                DINDEX BYTE,V=I    /*DATA POINT INDEX*/
                DATUM BYTE,B=16
                /* SP: 20 SEC OF NOISE FOLLOWED BY 60 SEC OF SIGNAL
                FOR 20 SAMPLES/SEC DATA.  SP WITH 10 S/S WILL
                USE ONLY 800 16 BIT BYTES.  LP: 300 SEC OF NOISE
                FOLLOWED BY 1300 SEC OF SIGNAL. */
                END
        END
END;
```

B.5 The SPDET file: Short-Period DETections

Datacomputer pathname: %TOP.SDAC.VELANET.SPDET.Yyyyy.Mmm

E.g., for July, 1978 : %TOP.SDAC.VELANET.SPDET.Y1978.M07

The short-period detections files (SPDET), referred to herein as the SPDET map, list the begin/end times of all the detections which are recorded on the NSPF files. These are computed by the SPDET-mapping Module described above in Section 4, and stored on the Datacomputer in monthly files.

Datalanguage description:

```
CREATE SPDET.Yyyyy.Mmm FILE LIST(0,3500,35000),
                              IA=51,ID=1200,II=5000
        DETECTION STRUCT
                INDEX BYTE,V=I
                STA STR(5),I=D
                STANDEX BYTE
                SDATE INT(6),I=D
                STIME INT(8)
                SINDEX BYTE
                EDATE INT(6)
                ETIME INT(8)
                EINDEX BYTE
        END;
```

C. Test-related Datalanguage

This appendix lists most of the Datalanguage that the SWF-D program is capable of transmitting.

C.1 To check for flagged arrivals

Prior to sending a Datalanguage request to check for flagged arrivals, the SWF-D program will open the appropriate Datacomputer files and ports. These are listed below, along with the synonym for each as it appears in the Datalanguage request:

Datacomputer Pathname	Synonym
%TOP.SDAC.VELANET.PESF.Y1978.M07.D02	ESF
%TOP.SDAC.CCA.SWF.REQ	REQ

It is assumed that the ESF file is opened in READ mode. In addition, Req should be open as a 36-bit port for reading the request parameters into core from the ESF file.

The following Datalanguage request is sent to the Datacomputer when there are long-period waveforms to copy.

```
FOR ESF WITH ANY ARRIVALS WITH WAVEFORMAVAIL EQ 'T'
    FOR REQ,ARRIVALS  WITH WAVEFORMAVAIL EQ 'T'
        BEGIN
                EINDEX=EINDEX
                EVENTNUM=EVENTNUM
                AINDEX=AINDEX
                STA=STA
                CHANTYPE=CHANTYPE
                RATE=RATE
                CHANID=CHANID
                GAIN=GAIN
                COMP=COMP
                DATASEGSTART=DATASEGSTART
                PHASEARR=PHASEARR
                PHASEID=PHASEID
                AMP=AMP
        END;
```

C.2 To copy long-period data

Prior to sending the Datalanguage request to copy long-period data, the SWF-D program will open the appropriate Datacomputer files and ports. These are listed below, along with the synonym for each as it appears in the Datalanguage request:

Datacomputer Pathname	Synonym
%TOP.SDAC.VELANET.PESF.Y1978.M07.D02	PESF
%TOP.SDAC.VELANET.PSWF.Y1978.M07.D02	PSWF
%TOP.SDAC.VELANET.NLPF.Y1978.M07.D02	NLPF
%TOP.SDAC.CCA.SWF.PUTL	PUTL

It is assumed that the PESF file is opened in WRITE mode; the PSWF in APPEND mode; and the NLPF in READ mode. In addition, PUTL should be open as a 36-bit port for reading in the request-driving parameters from a local Tenex file.

The following Datalanguage request is sent to the Datacomputer when there are long-period waveforms to copy.

```
BEGIN
FOR X IN PUTL.ESFPUT
        UPDATE Y IN PESF WITH Y.EINDEX EQ X.EINDEX
                UPDATE Z IN Y.ARRIVALS WITH Z.AINDEX EQ X.AINDEX
                        BEGIN
                                Z.DATASEGSTART=X.DATASEGSTART
                                Z.AMP=0
                                Z.WAVEFORMAVAIL='Y'
                        END
APPEND A IN PSWF, B IN PUTL.SWFPUT
        BEGIN
        A.EVENTID=B.EVENTID
        A.STA=B.STA
        A.CHANTYPE=B.CHANTYPE
        A.RATE=B.RATE
        A.CHANID=B.CHANID
        A.GAIN=B.GAIN
        A.COMP=B.COMP
        A.START=B.START
        A.DATAFORMAT='G'
        A.SCALEFACTOR=B.SCALEFACTOR
        FOR C IN NLPF WITH C.STA EQ B.STA
                FOR D IN C.DATA WITH D.INDEX GE B.STARTI AND D.INDEX LE B.ENDI
                        FOR E IN A.TIMESERIES, F IN D.TIMESERIES WITH B.TYP EQ F.TYPE
                                E.DATUM=F.DATUM
        END
END;
```

C.3 To copy short-period data

Prior to sending the Datalanguage request to copy short-period data, SWF-D will issue Datalanguage commands to open the appropriate FILEs and PORTs. These are listed below, along with the synonym for each as it appears in the Datalanguage request:

Datacomputer Pathname	Synonym
%TOP.SDAC.VELANET.PESF.Y1978.M07.D02	PESF
%TOP.SDAC.VELANET.PSWF.Y1978.M07.D02	PSWF
%TOP.SDAC.VELANET.NSPF.Y1978.M07.D02	NSPF
%TOP.SDAC.CCA.SWF.PUTS	PUTS

It is assumed that the PESF file is opened in WRITE mode; the PSWF in APPEND mode; and the NSPF in READ mode. In addition, PUTS should be open as a 36-bit port for reading in the request-driving parameters from a Tenex file.

The following Datalanguage request is sent by the program when there are short-period waveforms to move.

```
BEGIN
FOR X IN PUTS.ESFPUT
        UPDATE Y IN PESF WITH Y.EINDEX EQ X.EINDEX
                UPDATE Z IN Y.ARRIVALS WITH Z.AINDEX EQ X.AINDEX
                        BEGIN
                                Z.DATASEGSTART=X.DATASEGSTART
                                Z.AMP=0
                                Z.WAVEFORMAVAIL='Y'
                        END
APPEND A IN PSWF, B IN PUTS.SWFPUT
        BEGIN
        A.EVENTID=B.EVENTID
        A.STA=B.STA
        A.CHANTYPE=B.CHANTYPE
        A.RATE=B.RATE
        A.CHANID=B.CHANID
        A.GAIN=B.GAIN
        A.COMP=B.COMP
        A.START=B.START
        A.DATAFORMAT='G'
        A.SCALEFACTOR=B.SCALEFACTOR
        FOR C IN NSPF WITH C.STINDEX EQ B.STINDEX
                FOR D IN C.DATA WITH D.DATE = B.DSDATE AND D.TIME GE B.DSTIME AND D.TIME LE B.DETIME
                        FOR E IN  A.TIMESERIES, F IN D.TIMESERIES
                                E.DATUM=F.DATUM
        END
END;
```

C.4 To generate a map of short-period detections

Prior to sending the Datalanguage request to generate a short-period detections map, the SWF-D program will open the appropriate Datacomputer files. These are listed below, along with the synonym for each as it appears in the Datalanguage request:

Datacomputer Pathname	Synonym
%TOP.SDAC.VELANET.NSPF.Y1978.M07.D02	SPF
%TOP.SDAC.VELANET.SPDET.Y1978.M07	SPDET
%TOP.SDAC.VELANET.PROTOTYPES.LIST1	LIST1

It is assumed that the NSPF file is opened in READ mode and the SPDET file in APPEND mode. The LIST1 file is used only for Datalanguage loop control.

The following Datalanguage request is sent by the program to generate the SPDET map.

```
BEGIN
DECLARE F INT
F=1
UNTIL F<0 DO
        BEGIN
        FOR SPF WITH FLAG EQ F AND STA NE *'XXXXX*'
                BEGIN
                DECLARE ODATE INT       DECLARE OTIME INT
                DECLARE ODEX INT        DECLARE PDATE INT
```

```
                DECLARE PTIME INT       DECLARE CSTADEX INT
                DECLARE CCOUNT INT      DECLARE CSTA STR(5)
                CSTA=STA
                CSTADEX=STINDEX
                CCOUNT=COUNT
                FOR DATA
                        BEGIN
                        IF INDEX EQ 1 THEN
                                BEGIN
                                ODATE=DATE
                                OTIME=TIME
                                ODEX=1
                                END
                         ELSE IF DET EQ 1 THEN
                                FOR SPDET,LIST1
                                        BEGIN
                                        STA=CSTA
                                        STANDEX=CSTADEX
                                        SDATE=ODATE
                                        STIME=OTIME
                                        SINDEX=ODEX
                                        EDATE=PDATE
                                        ETIME=PTIME
                                        EINDEX=INDEX-1
                                        ODATE=DATE
                                        OTIME=TIME
                                        ODEX=INDEX
                                        END
                        PDATE=DATE
                        PTIME=TIME
                        END
                        FOR SPDET,LIST1
                                BEGIN
                                STA=CSTA
                                STANDEX=CSTADEX
                                SDATE=ODATE
                                STIME=OTIME
                                SINDEX=ODEX
                                EDATE=PDATE
                                ETIME=PTIME
                                EINDEX=CCOUNT
                                END
                END
        F=F-1
        END
END;
```

D. Sample Scripts of Datacomputer Sessions

D.1 Task: To sift ESF files for flagged arrivals

```
;;;
```

```
;;;
```

```
;;;
```

```
;;;
```

```
;;;
```

```
;;;
```

D.2 Task: To copy waveforms into SWF files

```
;;;
```

```
;;;
```

```
;;;
```

```
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
:               The following lines are typical Datacomputer messages        :
:               which reflect the file manipulation progress                 :
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
;S359 790110014259      SXOP: SDAX OPEN = SDAC.VELANET.NLPF.Y1978.M05.D26
.I230 790110014305      OCPBO: OPENING INPUT SOCKET PORT= PUTL
;I239 790110014307      OCPBO: OPENED INPUT PORT= PUTL
;S359 790110014309      SXOP: SDAX OPEN = SDAC.CCA.SWF.SWF 790109232026
;S359 790110014311      SXOP: SDAX OPEN = SDAC.CCA.SWF.ESF
;S350 790110014315      SXAX2: SDA ALLOCATE = 560,
                        SDAC.CCA.SWF.ESF 3330;58;4225
;S350 790110014348      SXAX2: SDA ALLOCATE = 5,
                        SDAC.VELANET.NLPF.Y1978.M05.D26 3330;58;890
!S311 790110014348      SXCX73: STAGING INVERSION PGS FOR FILE = 1,
                        SDAC.VELANET.NLPF.Y1978.M05.D26 TBM;14;968856
;S320 790110014358      SXCX8: STAGING COMPLETED FOR FILE =
                        SDAC.VELANET.NLPF.Y1978.M05.D26
;S350 790110014401      SXAX2: SDA ALLOCATE = 560,
                        SDAC.VELANET.NLPF.Y1978.M05.D26 3330;58;4845
!S311 790110014401      SXCX73: STAGING DATA FOR FILE = 560,
                        SDAC.VELANET.NLPF.Y1978.M05.D26 TBM;14;968016
;S320 790110014428      SXCX8: STAGING COMPLETED FOR FILE =
                        SDAC.VELANET.NLPF.Y1978.M05.D26
;S350 790110014432      SXAX2: SDA ALLOCATE = 320, SDAC.CCA.SWF.SWF 3330;59;8900
;J200 790110014508      RHRUN: READY FOR REQUEST
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
:               Perform administrative functions and record task progress    :
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
.J280 790110014510      CLOSE SWF;CLOSE PESF;CLOSE NLPF;
;J209 790110014510      RHRUN: EXECUTION COMPLETE
;J200 790110014510      RHRUN: READY FOR REQUEST
;J209 790110014511      RHRUN: EXECUTION COMPLETE
;J200 790110014511      RHRUN: READY FOR REQUEST
;J209 790110014513      RHRUN: EXECUTION COMPLETE
```

```
;;;
```

```
;;;
```

```
;;;
```

D.3 Task: To generate SPDET Map

```
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
:              SWF-D program initiating Datacomputer session                 :
:                                                                            :
:              Task:  To generate SPDET files for the period                 :
:                     1 July 1978 through 26 July 1978 (per ASL advice)      :
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
#J150 790117040139      FCRUN: V='DC-5/02.00.1' J=3 DT='TUESDAY, JANUARY
                                  16, 1979 23:01:39-EST' S='CCA'
!0041 790117040139      DNCTNX: DATACOMPUTER GOING DOWN IN 346 MIN BECAUSE
                                SYSTEM IS GOING DOWN AT WED JAN 17 79
                                5:00:00AM-EST FOR 240 MIN DUE TO SCHEDULED PM
#J200 790117040139      RHRUN: READY FOR REQUEST
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
:              SWF-D SPDET file-updater logs in                              :
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
.I280 790117040140      Login SDAC.CCA.SWF;
#0032 790117040142      ASPRIN: HOST='CCA' SOCK=1900552 REALMS=3756 CPUMS=675
                                PGFLTS=52 PAGSEC=196 INCORE=3757 LKTOT=5 DIRF=1
                                DINS=3 DIRD=8 DIWR=2 NAFN=2 DLMSGWR=1 DLMSGRD=2
                                DLBYWR=348 DLBYRD=21
#0033 790117040143      ASLOG: USER='SDAC.CCA.SWF',Q=100
#J209 790117040143      RHRUN: EXECUTION COMPLETE
#J200 790117040143      RHRUN: READY FOR REQUEST
```

```
;;;
```

```
;;;
```

```
;;;
```

```
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
:              The followins lines are typical Datacomputer messages          :
:              which reflect the file manipulation progress.                  :
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
#S359 790117040300      SXOP: SDAX OPEN = SDAC.VELANET.PROTOTYPES.LIST1
#S359 790117040304      SXOP: SDAX OPEN = SDAC.VELANET.NSPF.Y1978.M07.D01
#S359 790117040306      SXOP: SDAX OPEN = SDAC.VELANET.SPDET.Y1978.M07
#S350 790117040311      SXAX2: SDA ALLOCATE = 55. SDAC.VELANET.SPDET.Y1978.M07
#S350 790117040318      SXAX2: SDA ALLOCATE = 5.
                              SDAC.VELANET.NSPF.Y1978.M07.D01
!S311 790117040318      SXCX73: STAGING INVERSION PGS FOR FILE = 2.
                              SDAC.VELANET.NSPF.Y1978.M07.D01 TBM#14#1290744
#S320 790117040328      SXCX8: STAGING COMPLETED FOR FILE =
                              SDAC.VELANET.NSPF.Y1978.M07.D01
#S350 790117040332      SXAX2: SDA ALLOCATE = 5.
                              SDAC.VELANET.NSPF.Y1978.M07.D01 3330#58#490
#S320 790117040336      SXCX8: STAGING COMPLETED FOR FILE =
                              SDAC.VELANET.NSPF.Y1978.M07.D01
#S350 790117040338      SXAX2: SDA ALLOCATE = 560.
                              SDAC.VELANET.NSPF.Y1978.M07.D01 3330#58#3570
#S320 790117040419      SXCX8: STAGING COMPLETED FOR FILE =
                              SDAC.VELANET.NSPF.Y1978.M07.D01
#S350 790117040455      SXAX2: SDA ALLOCATE =560.
                              SDAC.VELANET.NSPF.Y1978.M07.D01 3330#58#4130
!S311 790117040456      SXCX73: STAGING DATA FOR FILE = 560.
                              SDAC.VELANET.NSPF.Y1978.M07.D01 TBM#14#1289400
#S320 790117040535      SXCX8: STAGING COMPLETED FOR FILE =
                              SDAC.VELANET.NSPF.Y1978.M07.D01
#S350 790117040620      SXAX2: SDA ALLOCATE = 70.
                              SDAC.VELANET.SPDET.Y1978.M07 3330#58#4690
#S351 790117040710      SRMC8: SDA MERGE = 5.
                              SDAC.VELANET.SPDET.Y1978.M07 3330#58
#J209 790117040712      RHRUN: EXECUTION COMPLETE
#J200 790117040712      RHRUN: READY FOR REQUEST
```

```
;;;
```

```
.I280 790117040733      BEGIN DECLARE INT F=1
.I280 790117040734      UNTIL F<0 DO BEGIN
.I280 790117040734      FOR SPF WITH FLAG EQ F AND STA NE 'XXXXX' BEGIN
.I280 790117040734              DECLARE ODATE INT DECLARE OTIME INT
                                DECLARE ODEX INT
.I280 790117040734              DECLARE PDATE INT DECLARE PTIME INT
.I280 790117040735              DECLARE CSTADEX INT DECLARE CCOUNT INT
.I280 790117040735              DECLARE CSTA STR(5) CSTA=STA
.I280 790117040735              CSTADEX=STINDEX CCOUNT=COUNT
.I280 790117040735      FOR DATA BEGIN
.I280 790117040736              IF INDEX EQ 1 THEN
.I280 790117040736              BEGIN ODATE=DATE OTIME=TIME ODEX=1 END
.I280 790117040736      ELSE IF DET EQ 1 THEN
.I280 790117040737      FOR SPDET,LIST1 BEGIN
.I280 790117040737              STA=CSTA STANDEX=CSTADEX
.I280 790117040737              SDATE=ODATE STIME=OTIME SINDEX=ODEX
.I280 790117040737              EDATE=PDATE ETIME=PTIME EINDEX=INDEX-1
.I280 790117040737              ODATE=DATE OTIME=TIME ODEX=INDEX END
.I280 790117040738              PDATE=DATE PTIME=TIME END
.I280 790117040738      FOR SPDET,LIST1 BEGIN
.I280 790117040738              STA=CSTA STANDEX=CSTADEX
.I280 790117040738              SDATE=ODATE STIME=OTIME SINDEX=ODEX
.I280 790117040738              EDATE=PDATE ETIME=PTIME EINDEX=CCOUNT END
.I280 790117040738      END F=F-1 END END;
#J205 790117040754      RHRUN: SUCCESSFUL COMPILATION
#S359 790117040754      SXOP: SDAX OPEN = SDAC.VELANET.PROTOTYPES.LIST1
#S359 790117040756      SXOP: SDAX OPEN = SDAC.VELANET.NSPF.Y1978.M07.D02
#S359 790117040757      SXOP: SDAX OPEN = SDAC.VELANET.SPDET.Y1978.M07
#J209 790117041601      RHRUN: EXECUTION COMPLETE
#J200 790117041602      RHRUN: READY FOR REQUEST
.I280 790117041604      CLOSE SPF; CLOSE SPDET;
#J209 790117041605      RHRUN: EXECUTION COMPLETE
#J200 790117041605      RHRUN: READY FOR REQUEST
#J209 790117041605      RHRUN: EXECUTION COMPLETE
#J200 790117041605      RHRUN: READY FOR REQUEST
```

```
;;;
```

```
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
:                And so on until the last day (-1) has been processed.          :
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
.I280 790118011553      LIST %TOP.SDAC.VELANET.NSPF.Y1978.M07.D25;
.I280 790118011555      ULPC: STARTING LIST OUTPUT
 SDAC.VELANET.NSPF.Y1978.M07.D25 FILE
.I281 790118011555      COLI: FINISHED WITH LIST OUTPUT
;J209 790118011555      RHRUN: EXECUTION COMPLETE
;J200 790118011555      RHRUN: READY FOR REQUEST
.I280 790118011556      OPEN %TOP.SDAC.VELANET.NSPF.Y1978.M07.D25, SYN = SPF;
;J209 790118011558      RHRUN: EXECUTION COMPLETE
;J200 790118011558      RHRUN: READY FOR REQUEST
.I280 790118011559      LIST SPF %STATUS;
.I280 790118011559      COLP: STARTING LIST OUTPUT
 NAME=SDAC.VELANET.NSPF.Y1978.M07.D25 FUNC=FILE PRIV=R STAT=ONLINE MODE=READ
 SYNM=SPF
.I281 790118011559      COLI: FINISHED WITH LIST OUTPUT
;J209 790118011559      RHRUN: EXECUTION COMPLETE
;J200 790118011559      RHRUN: READY FOR REQUEST
.I280 790118011559      OPEN %TOP.SDAC.VELANET.SPDET.Y1978.M07 APPEND DEFER,
                        SYN = SPDET;
;J209 790118011603      RHRUN: EXECUTION COMPLETE
;J200 790118011603      RHRUN: READY FOR REQUEST
.I280 790118011603      BEGIN DECLARE F INT F=1
.I280 790118011604      UNTIL F<0 DO BEGIN
.I280 790118011604      FOR SPF WITH FLAG EQ F AND STA NE 'XXXXX' BEGIN
.I280 790118011608      . . .  END F=F-1 END END;
;J205 790118011618      RHRUN: SUCCESSFUL COMPILATION
;J209 790118012105      RHRUN: EXECUTION COMPLETE
;J200 790118012105      RHRUN: READY FOR REQUEST
.I280 790118012107      CLOSE SPF; CLOSE SPDET;
;J209 790118012109      RHRUN: EXECUTION COMPLETE
;J200 790118012109      RHRUN: READY FOR REQUEST
;J209 790118012110      RHRUN: EXECUTION COMPLETE
;J200 790118012110      RHRUN: READY FOR REQUEST
```

```
;;;
```

E. Test-related Detections

E.1 AOUT, 1-3 July 1978 Arrivals

This section of Appendix E contains a list of the waveform-copy requests, and the surrounding event entries, which were specially generated as test data for the SWF-D program by SDAC and stored on the Datacomputer as file %TOP.SDAC.VELANET.PESF.Y1978.M07.D41.

The listing format precludes the use of column headers, but it is hoped that a brief description of the data displayed here, when studied in conjunction with the AOUT PORT description in Appendix A.6 above, will make the printout understandable. Each event entry shown below consists of one long (folded) line of event data which begins with the unique event number assigned by SDAC. It is followed by a list of associated arrivals, one per line, each of which begins with the station name. A flagged arrival can be identified by the "T" in the rightmost column of the line. The event entry ends with a single right-parenthesis at the left margin.

```
781831173 078183 02485940 0055 018 S H 06594 N 072901 W 018 000 000 S 00779 00390 1710 099 07  521 038 14
000 000 00 000 0   78111705250600        001 095
ZOBO    01       G A 0 0232 3479 000060 99989990 078183 02540740 P      07     0000240 000 00000 N N N T
ZOBO    20       H Z 0 0232 3479 000000 99989990 078183 02540740 P      07     0000000 000 00000 N N N T
ZOBO    01       G A 0 0232 3479 000060 99989990 078183 02581730 S      26     0000240 000 00000 N N N T
ZOBO    01       G A 0 0232 3479 000900 99989990 078183 03010600 LQ     34     0000900 000 00000 N N N T
ZOBO    01       G A 0 0232 3479 000900 99989990 078183 03025880 LR     33     0000900 000 00000 N N N T
ANMO    20       H Z 0 0418 1246 000000 99989990 078183 02565060 P      07     0000000 000 00000 N N N T
ANMO    01       G A 0 0418 1246 000060 99989990 078183 02565060 P      07     0000240 000 00000 N N N T
ANMO    01       G A 0 0418 1246 000060 99989990 078183 03031090 S      26     0000240 000 00000 N N N T
ANMO    01       G A 0 0418 1246 000900 99989990 078183 03081790 LQ     34     0000900 000 00000 N N N T
ANMO    01       G A 0 0418 1246 000900 99989990 078183 03120850 LR     33     0000900 000 00000 N N N T
LHC     10       U Z   0439 1562 000000 00000000 078183 02570700 P      07  E  0000000 000 -0033 Y N N N
PWY     20 PWSP  H Z 0 0484 1275 078183 02572280 078183 02574280 P      07     0000000 000 00000 N N N Y
PWY     20 P999  H Z 0 0484 1275 000020 99989990 078183 02574280 P      07     0000060 000 00000 N N N T
PWY     01 PWLP  H D 0 0484 1275 078183 02564200 078183 02574280 P      07     0000000 000 00000 N N N Y
PWY     20 P999  H Z   0484 1275 000000 00000000 078183 02574320 P      07     0000269 010 00037 Y Y N N
PWY     20 P999  H Z   0484 1275 000000 00000000 078183 02590810 P.CP   03     0000000 000 -0320 N N N N
PWY     20 PWSP  H D 0 0484 1275 078183 03042550 078183 03044550 S      26     0000000 000 00000 N N N Y
PWY     01 PWLP  H D 0 0484 1275 078183 03034500 078183 03044550 S      26     0000000 000 00000 N N N Y
PWY     01 PWLP  H A 0 0484 1275 078183 02570800 078183 03120890 LQ     34     0000000 000 00000 N N N Y
PWY     01 PWLP  H A 0 0484 1275 078183 03012600 078183 03162680 LR     33     0000000 000 00000 N N N Y
FFC     10       U Z   0534 1430 000000 00000000 078183 02582020 P      07 +I  0000150 004 00042 Y Y N N
SES     10       U Z   0540 1307 000000 00000000 078183 02582520 P      07 +I  0000000 000 00068 Y N N N
EDM     10       U Z   0569 1297 000000 00000000 078183 02584540 P      07 +I  0000670 006 -0007 Y Y N N
FRB     10       U Z   0571 1852 000000 00000000 078183 02584630 P      07 +E  0000260 005 -0036 Y Y N N
YKC     10       U Z   0635 1325 000000 00000000 078183 02593000 P      07  E  0000000 000 -0028 Y N N N
YKA     10 Y050  U Z   0636 1324 000000 00000000 078183 02593140 P      07     0000000 000 00077 Y N N N
RES     10       U Z   0692 1565 000000 00000000 078183 03000600 P      07  E  0000060 007 -0096 Y Y N N
INK     10       U Z   0733 1154 000000 00000000 078183 03003180 P      07 +I  0000200 006 -0002 Y Y N N
MBC     10       U Z   0741 1315 000000 00000000 078183 03003620 P      07 +I  0000740 007 00000 Y Y N N
ALK     20 NJAK  H Z 0 0747 1060 078183 03002000 078183 03004000 P      07     0000000 000 00000 N N N Y
ALK     20 NJAK  H Z   0747 1060 000000 00000000 078183 03004070 P      07     0000270 010 00068 Y Y N N
ALK     20 NJAK  H Z   0747 1060 000000 00000000 078183 03032480 PP     06     0000000 000 -0130 N N N N
ALE     10       U Z   0760 1908 000000 00000000 078183 03004750 P      07  E  0000200 008 00008 Y Y N N
ALK     20 CNAK  H Z 0 0769 1046 078183 03003280 078183 03005280 P      07     0000000 000 00000 N N N Y
ALK     20 CNAK  H Z   0769 1046 000000 00000000 078183 03005290 P      07     0000088 007 00000 Y Y N N
ALK     20 CNAK  H Z   0769 1046 000000 00000000 078183 03034640 PP     06     0000060 011 00120 N N N N
ALK     20 BFAK  H Z   0773 1018 000000 00000000 078183 03005440 P      07     0000162 009 -0032 Y Y N N
ALK     20 BFAK  H Z 0 0773 1018 078183 03003470 078183 03005470 P      07     0000000 000 00000 N N N Y
```

ALK	01	BFAK	H	A	0	0773	1018	000060	99989990	078183	03005470	P	07	0000240	000	00000	N	N	N	T
ALK	20	BFAK	H	Z		0773	1018	000000	00000000	078183	03034680	PP	06	0000000	000	-0110	N	N	N	N
ALK	01	BFAK	H	A	0	0773	1018	000060	99989990	078183	03104660	S	26	0000240	000	00000	N	N	N	T
ALK	01	BFAK	H	A	0	0773	1018	000900	99989990	078183	03275290	LQ	34	0000900	000	00000	N	N	N	T
ALK	01	BFAK	H	A	0	0773	1018	000900	99989990	078183	03342390	LR	33	0000900	000	00000	N	N	N	T
ALK	20	UCAK	H	Z		0803	0957	000000	00000000	078183	03011090	P	07	0000053	009	-0059	Y	Y	N	N
ALK	20	UCAK	H	Z	0	0803	0957	078183	03005140	078183	03011140	P	07	0000000	000	00000	N	N	N	Y
ALK	20	TNAK	H	Z		0810	0931	000000	00000000	078183	03011450	P	07	0000150	008	-0091	Y	Y	N	N
ALK	20	TNAK	H	Z	0	0810	0931	078183	03005530	078183	03011530	P	07	0000000	000	00000	N	N	N	Y
ALK	20	TNAK	H	Z		0810	0931	000000	00000000	078183	03041920	PP	06	0000062	011	-0010	N	N	N	N
NAO	01	NO1B	H	A	0	0812	2677	078183	03001600	078183	03011630	P	07	0000000	000	00000	N	N	N	Y
NAO	01	NO1B	H	A	0	0812	2677	078183	03102800	078183	03112840	S	26	0000000	000	00000	N	N	N	Y
NAO	01	NO1B	H	A	0	0812	2677	078183	03092300	078183	03242390	LQ	34	0000000	000	00000	N	N	N	Y
NAO	01	NO1B	H	A	0	0812	2677	078183	03171400	078183	03321400	LR	33	0000000	000	00000	N	N	N	Y
NAO	01	NEVT	H	D	0	0814	2681	078183	03001700	078183	03011750	P	07	0000000	000	00000	N	N	N	Y
NAO	10	NO86	H	Z		0814	2681	000000	00000000	078183	03011840	P	07	0000060	010	00085	Y	Y	N	N
NAO	01	NEVT	H	D	0	0814	2681	078183	03103000	078183	03113060	S	26	0000000	000	00000	N	N	N	Y
NAO	01	NEVT	H	T	0	0814	2681	078183	03093000	078183	03243090	LQ	34	0000000	000	00000	N	N	N	Y
NAO	01	NEVT	H	Z	0	0814	2681	078183	03172200	078183	03322200	LR	33	0000000	000	00000	N	N	N	Y
NAO	01	NEVT	H	R	0	0814	2681	078183	03172200	078183	03322200	LR	33	0000000	000	00000	N	N	N	Y
NAO	10	C3UU	H	Z	0	0815	2682	000020	00000000	078183	03011800	P	07	0000060	000	00000	N	N	N	T
ALK	20	ATAK	H	Z	0	0988	0668	078183	03022070	078183	03024070	P	07	0000000	000	00000	N	N	N	Y
ALK	01	ATAK	H	A	0	0988	0668	078183	03014000	078183	03024070	P	07	0000000	000	00000	N	N	N	Y
ALK	01	ATAK	H	A	0	0988	0668	078183	03130900	078183	03140990	S	26	0000000	000	00000	N	N	N	Y
ALK	01	ATAK	H	A	0	0988	0668	078183	03215700	078183	03365720	LQ	34	0000000	000	00000	N	N	N	Y
ALK	01	ATAK	H	A	0	0988	0668	078183	03303600	078183	03453660	LR	33	0000000	000	00000	N	N	N	Y
MAIO	01		G	A	0	1183	3036	000060	99989990	078183	03074790	PKPDF	13	0000240	000	00000	N	N	N	T
MAIO	20		H	Z	0	1183	3036	000000	99989990	078183	03074790	PKPDF	13	0000000	000	00000	N	N	N	T
MAIO	01		G	A	0	1183	3036	000060	99989990	078183	03144270	SKSAC	24	0000240	000	00000	N	N	N	T
MAIO	01		G	A	0	1183	3036	000900	99989990	078183	03450880	LQ	34	0000900	000	00000	N	N	N	T
MAIO	01		G	A	0	1183	3036	000900	99989990	078183	03554410	LR	33	0000900	000	00000	N	N	N	T
KSRS	20	SP3C	H	Z	0	1322	0280	000020	99989990	078183	03081470	PKPDF	13	0000060	000	00000	N	N	N	T
KSRS	20	KEVT	H	Z	0	1322	0280	000020	99989990	078183	03081470	PKPDF	13	0000060	000	00000	N	N	N	T
KSRS	01	KLPA	H	A	0	1322	0280	000060	99989990	078183	03081470	PKPDF	13	0000240	000	00000	N	N	N	T
KSRS	01	KEVT	H	D	0	1322	0280	000060	99989990	078183	03081470	PKPDF	13	0000240	000	00000	N	N	N	T
KSRS	01	KLPA	H	A	0	1322	0280	000060	99989990	078183	03152480	SKSAC	24	0000240	000	00000	N	N	N	T
KSRS	01	KEVT	H	D	0	1322	0280	000060	99989990	078183	03152480	SKSAC	24	0000240	000	00000	N	N	N	T
KSRS	01	KLPA	H	A	0	1322	0280	000900	99989990	078183	03561220	LQ	34	0000900	000	00000	N	N	N	T
KSRS	01	KEVT	H	T	0	1322	0280	000900	99989990	078183	03561220	LQ	34	0000900	000	00000	N	N	N	T
KSRS	01	KLPA	H	A	0	1322	0280	000900	99989990	078183	04071370	LR	33	0000900	000	00000	N	N	N	T

```
KSRS    01 KEVT H Z 0 1322 0280 000900 99989990 078183 04071370 LR     33    0000900 000 00000 N N N T
KSRS    01 KEVT H R 0 1322 0280 000900 99989990 078183 04071370 LR     33    0000900 000 00000 N N N T
CTAO    20      H Z 0 1397 1039 000000 99989990 078183 03082930 PKPDF  13    0000000 000 00000 N N N T
CTAO    01      G A 0 1397 1039 000060 99989990 078183 03082930 PKPDF  13    0000240 000 00000 N N N T
CTAO    01      G A 0 1397 1039 000060 99989990 078183 03153710 SKSDF  25    0000240 000 00000 N N N T
CTAO    01      G A 0 1397 1039 000900 99989990 078183 03472670 LQ     34    0000900 000 00000 N N N T
CTAO    01      G A 0 1397 1039 000900 99989990 078183 04012250 LR     33    0000900 000 00000 N N N T
NWAO    20      H Z 0 1522 1580 000000 99989990 078183 03084970 PKPDF  13    0000000 000 00000 N N N T
NWAO    01      G A 0 1522 1580 000060 99989990 078183 03084970 PKPDF  13    0000240 000 00000 N N N T
NWAO    01      G A 0 1522 1580 000060 99989990 078183 03155480 SKSDF  25    0000240 000 00000 N N N T
NWAO    01      G A 0 1522 1580 000900 99989990 078183 03541300 LQ     34    0000900 000 00000 N N N T
NWAO    01      G A 0 1522 1580 000900 99989990 078183 04090600 LR     33    0000900 000 00000 N N N T
GUMO    01      G A 0 1598 3536 000060 99989990 078183 03090010 PKPDF  13    0000240 000 00000 N N N T
GUMO    20      H Z 0 1598 3536 000000 99989990 078183 03090010 PKPDF  13    0000000 000 00000 N N N T
GUMO    01      G A 0 1598 3536 000060 99989990 078183 03160320 SKSDF  25    0000240 000 00000 N N N T
GUMO    01      G A 0 1598 3536 000900 99989990 078183 04120500 LQ     34    0000900 000 00000 N N N T
GUMO    01      G A 0 1598 3536 000900 99989990 078183 04250520 LR     33    0000900 000 00000 N N N T
)
781831199 078183 02524380 0037 005 S H 10836 N 123190 E 005 000 000 S 06780 05445 0360 255 22  405 022 02
000 000 00 000 0   78111706130600        001 077
PWY     01 PWLP H D 0 1081 3046 000060 00000476 078183 02524380        21    0000240 000 00000 N N N T
PWY     20 P999 H Z 0 1081 3046 000020 99989990 078183 02524380        21    0000060 000 00000 N N N T
PWY     20 PWSP H Z 0 1081 3046 078183 02522380 078183 02524380        21    0000000 000 00000 N N N Y
PWY     20 PWSP H D 0 1081 3046 078183 03185190 078183 03191190 S      26    0000000 000 00000 N N N Y
PWY     01 PWLP H D 0 1081 3046 078183 03181100 078183 03191190 S      26    0000000 000 00000 N N N Y
PWY     01 PWLP H A 0 1081 3046 078183 03243600 078183 03393620 LQ     34    0000000 000 00000 N N N Y
PWY     01 PWLP H A 0 1081 3046 078183 03350500 078183 03500540 LR     33    0000000 000 00000 N N N Y
GUMO    01      G A 0 0181 0967 000060 99989990 078183 02565520 P      07    0000240 000 00000 N N N T
GUMO    20      H Z 0 0181 0967 000000 99989990 078183 02565520 P      07    0000000 000 00000 N N N T
GUMO    01      G A 0 0181 0967 000060 99989990 078183 03001870 S      26    0000240 000 00000 N N N T
GUMO    01      G A 0 0181 0967 000000 99989990 078183 03005970 LQ     34    0000000 000 00000 N N N T
GUMO    01      G A 0 0181 0967 000900 99989990 078183 03024060 LR     33    0000900 000 00000 N N N T
KSRS    01 KLPA H A 0 0268 1897 000060 99989990 078183 02582480 P      07    0000240 000 00000 N N N T
KSRS    01 KEVT H D 0 0268 1897 000060 99989990 078183 02582480 P      07    0000240 000 00000 N N N T
KSRS    20 KEVT H Z 0 0268 1897 000020 99989990 078183 02582480 P      07    0000060 000 00000 N N N T
KSRS    20 SP3C H Z 0 0268 1897 000020 99989990 078183 02582480 P      07    0000060 000 00000 N N N T
KSRS    01 KLPA H A 0 0268 1897 000060 99989990 078183 03030260 S      26    0000240 000 00000 N N N T
KSRS    01 KEVT H D 0 0268 1897 000060 99989990 078183 03030260 S      26    0000240 000 00000 N N N T
KSRS    01 KLPA H A 0 0268 1897 000900 99989990 078183 03040710 LQ     34    0000900 000 00000 N N N T
KSRS    01 KEVT H T 0 0268 1897 000900 99989990 078183 03040710 LQ     34    0000900 000 00000 N N N T
```

KSRS	01	KLPA	H	A	0	0268	1897	000900	99989990	078183	03064550	LR	33	0000900	000	00000	N	N	N	T
KSRS	01	KEVT	H	Z	0	0268	1897	000900	99989990	078183	03064550	LR	33	0000900	000	00000	N	N	N	T
KSRS	01	KEVT	H	R	0	0268	1897	000900	99989990	078183	03064550	LR	33	0000900	000	00000	N	N	N	T
CTAO	20		H	Z	0	0382	3215	000000	99989990	078183	03000480	P	07	0000000	000	00000	N	N	N	T
CTAO	01		G	A	0	0382	3215	000060	99989990	078183	03000480	P	07	0000240	000	00000	N	N	N	T
CTAO	01		G	A	0	0382	3215	000060	99989990	078183	03060110	S	26	0000240	000	00000	N	N	N	T
CTAO	01		G	A	0	0382	3215	000900	99989990	078183	03112450	LQ	34	0000900	000	00000	N	N	N	T
CTAO	01		G	A	0	0382	3215	000900	99989990	078183	03144390	LR	33	0000900	000	00000	N	N	N	T
NWAO	01		G	A	0	0439	0085	000060	99989990	078183	03005150	P	07	0000240	000	00000	N	N	N	T
NWAO	20		H	Z	0	0439	0085	000000	99989990	078183	03005150	P	07	0000000	000	00000	N	N	N	T
NWAO	01		G	A	0	0439	0085	000060	99989990	078183	03072550	S	26	0000240	000	00000	N	N	N	T
NWAO	01		G	A	0	0439	0085	000900	99989990	078183	03134190	LQ	34	0000900	000	00000	N	N	N	T
NWAO	01		G	A	0	0439	0085	000900	99989990	078183	03173620	LR	33	0000900	000	00000	N	N	N	T
ALK	01	ATAK	H	A	0	0579	2426	078183	03013600	078183	03023660	P	07	0000000	000	00000	N	N	N	Y
ALK	20	ATAK	H	Z	0	0579	2426	078183	03021660	078183	03023660	P	07	0000000	000	00000	N	N	N	Y
ALK	01	ATAK	H	A	0	0579	2426	078183	03093900	078183	03103900	S	26	0000000	000	00000	N	N	N	Y
ALK	01	ATAK	H	A	0	0579	2426	078183	03014600	078183	03164660	LQ	34	0000000	000	00000	N	N	N	Y
ALK	01	ATAK	H	A	0	0579	2426	078183	03073400	078183	03223480	LR	33	0000000	000	00000	N	N	N	Y
MAIO	01		G	A	0	0625	0968	000060	99989990	078183	03030850	P	07	0000240	000	00000	N	N	N	T
MAIO	20		H	Z	0	0625	0968	000000	99989990	078183	03030850	P	07	0000000	000	00000	N	N	N	T
MAIO	01		G	A	0	0625	0968	000060	99989990	078183	03113810	S	26	0000240	000	00000	N	N	N	T
MAIO	01		G	A	0	0625	0968	000900	99989990	078183	03243890	LQ	34	0000900	000	00000	N	N	N	T
MAIO	01		G	A	0	0625	0968	000900	99989990	078183	03295030	LR	33	0000900	000	00000	N	N	N	T
ALK	20	TNAK	H	Z	0	0762	2668	078183	03041330	078183	03043330	P	07	0000000	000	00000	N	N	N	Y
ALK	20	TNAK	H	Z		0762	2668	000000	00000000	078183	03043360	P	07	0000018	009	00023	Y	Y	N	N
ALK	20	UCAK	H	Z		0774	2682	000000	00000000	078183	03043940	P	07	0000009	010	-0050	Y	Y	N	N
ALK	20	UCAK	H	Z	0	0774	2682	078183	03041980	078183	03043980	P	07	0000000	000	00000	N	N	N	Y
ALK	01	BFAK	H	A	0	0803	2746	000060	99989990	078183	03045550	P	07	0000240	000	00000	N	N	N	T
ALK	20	BFAK	H	Z	0	0803	2746	078183	03043550	078183	03045550	P	07	0000000	000	00000	N	N	N	Y
ALK	20	BFAK	H	Z		0803	2746	000000	00000000	078183	03045590	P	07	0000000	000	00031	Y	N	N	N
ALK	01	BFAK	H	A	0	0803	2746	000060	99989990	078183	03150290	S	26	0000240	000	00000	N	N	N	T
ALK	01	BFAK	H	A	0	0803	2746	000900	99989990	078183	03300200	LQ	34	0000900	000	00000	N	N	N	T
ALK	01	BFAK	H	A	0	0803	2746	000900	99989990	078183	03372160	LR	33	0000900	000	00000	N	N	N	T
ALK	20	CNAK	H	Z	0	0810	2763	078183	03043930	078183	03045930	P	07	0000000	000	00000	N	N	N	Y
ALK	20	CNAK	H	Z		0810	2763	000000	00000000	078183	03045960	P	07	0000000	000	00025	Y	N	N	N
ALK	20	NJAK	H	Z		0827	2793	000000	00000000	078183	03050820	P	07	0000000	000	-0029	Y	N	N	N
ALK	20	NJAK	H	Z	0	0827	2793	078183	03044840	078183	03050840	P	07	0000000	000	00000	N	N	N	Y
NAO	10	C3UU	H	Z	0	0907	0658	000020	00000000	078183	03054770	P	07	0000060	000	00000	N	N	N	T
NAO	01	NEVT	H	D	0	0909	0657	078183	03044800	078183	03054860	P	07	0000000	000	00000	N	N	N	Y
NAO	01	NEVT	H	D	0	0909	0657	078183	03154600	078183	03164630	S	26	0000000	000	00000	N	N	N	Y

```
NAO     01 NEVT H T 0 0909 0657 078183 03252400 078183 03402400 LQ     34    0000000 000 00000 N N N Y
NAO     01 NEVT H Z 0 0909 0657 078183 03324300 078183 03474330 LR     33    0000000 000 00000 N N N Y
NAO     01 NEVT H R 0 0909 0657 078183 03324300 078183 03474330 LR     33    0000000 000 00000 N N N Y
NAO     01 NO1B H A 0 0911 0653 078183 03044900 078183 03054950 P      07    0000000 000 00000 N N N Y
NAO     01 NO1B H A 0 0911 0653 078183 03154800 078183 03164800 S      26    0000000 000 00000 N N N Y
NAO     01 NO1B H A 0 0911 0653 078183 03253000 078183 03403040 LQ     34    0000000 000 00000 N N N Y
NAO     01 NO1B H A 0 0911 0653 078183 03325000 078183 03475070 LR     33    0000000 000 00000 N N N Y
ANMO    20      H Z 0 1146 3046 000000 99989990 078183 03112510 PKPDF  13    0000000 000 00000 N N N T
ANMO    01      G A 0 1146 3046 000060 99989990 078183 03112510 PKPDF  13    0000240 000 00000 N N N T
ANMO    01      G A 0 1146 3046 000060 99989990 078183 03181360 SKSAC  24    0000240 000 00000 N N N T
ANMO    01      G A 0 1146 3046 000900 99989990 078183 03421850 LQ     34    0000900 000 00000 N N N T
ANMO    01      G A 0 1146 3046 000900 99989990 078183 03532610 LR     33    0000900 000 00000 N N N T
ZOBO    20      H Z 0 1677 2453 000000 99989990 078183 03125240 PKPDF  13    0000000 000 00000 N N N T
ZOBO    01      G A 0 1677 2453 000060 99989990 078183 03125240 PKPDF  13    0000240 000 00000 N N N T
ZOBO    01      G A 0 1677 2453 000060 99989990 078183 03195360 SKSDF  25    0000240 000 00000 N N N T
ZOBO    01      G A 0 1677 2453 000900 99989990 078183 04034630 LQ     34    0000900 000 00000 N N N T
ZOBO    01      G A 0 1677 2453 000900 99989990 078183 04202030 LR     33    0000900 000 00000 N N N T
)
781831678 078183 04014010 0074 014 S H 14722 S 175603 W 014 057 260 F 00807 00315 0320 169 12  565 040 11
000 000 00 000 0   781117065606OO       002 095
CTAO    01      G A 0 0367 0878 000060 99989990 078183 04084150 P      07    0000240 000 00000 N N N T
CTAO    20      H Z 0 0367 0878 000000 99989990 078183 04084150 P      07    0000000 000 00000 N N N T
CTAO    01      G A 0 0367 0878 000060 99989990 078183 04142240 S      26    0000240 000 00000 N N N T
CTAO    01      G A 0 0367 0878 000900 99989990 078183 04172370 LQ     34    0000900 000 00000 N N N T
CTAO    01      G A 0 0367 0878 000900 99989990 078183 04205940 LR     33    0000900 000 00000 N N N T
NWAO    20      H Z 0 0631 0906 000000 99989990 078183 04120110 P      07    0000000 000 00000 N N N T
NWAO    01      G A 0 0631 0906 000060 99989990 078183 04120110 P      07    0000240 000 00000 N N N T
NWAO    01      G A 0 0631 0906 000060 99989990 078183 04202870 S      26    0000240 000 00000 N N N T
NWAO    01      G A 0 0631 0906 000900 99989990 078183 04305770 LQ     34    0000900 000 00000 N N N T
NWAO    01      G A 0 0631 0906 000900 99989990 078183 04364370 LR     33    0000900 000 00000 N N N T
ALK     01 ATAK H A 0 0680 1683 078183 04113200 078183 04123270 P      07    0000000 000 00000 N N N Y
ALK     20 ATAK H Z 0 0680 1683 078183 04121270 078183 04123270 P      07    0000000 000 00000 N N N Y
ALK     20 ATAK H Z   0680 1683 000000 00000000 078183 04123330 P      07    0000000 000 00047 Y N N N
ALK     01 ATAK H A 0 0680 1683 078183 04202800 078183 04212890 S      26    0000000 000 00000 N N N Y
ALK     01 ATAK H A 0 0680 1683 078183 04143700 078183 04293730 LQ     34    0000000 000 00000 N N N Y
ALK     01 ATAK H A 0 0680 1683 078183 04212900 078183 04362960 LR     33    0000000 000 00000 N N N Y
KSRS    20 KEVT H Z 0 0744 1228 000020 99989990 078183 04131170 P      07    0000060 000 00000 N N N T
KSRS    01 KLPA H A 0 0744 1228 000060 99989990 078183 04131170 P      07    0000240 000 00000 N N N T
KSRS    20 SP3C H Z 0 0744 1228 000020 99989990 078183 04131170 P      07    0000060 000 00000 N N N T
KSRS    01 KEVT H D 0 0744 1228 000060 99989990 078183 04131170 P      07    0000240 000 00000 N N N T
```

KSRS	01	KLPA	H	A	0	0744	1228	000060	99989990	078183	04224230	S	26		0000240	000	00000	N	N	N	T
KSRS	01	KEVT	H	D	0	0744	1228	000060	99989990	078183	04224230	S	26		0000240	000	00000	N	N	N	T
KSRS	01	KLPA	H	A	0	0744	1228	000900	99989990	078183	04324970	LR	34		0000900	000	00000	N	N	N	T
KSRS	01	KEVT	H	T	0	0744	1228	000900	99989990	078183	04324970	LQ	34		0000900	000	00000	N	N	N	T
KSRS	01	KLPA	H	A	0	0744	1228	000900	99989990	078183	04401420	LR	33		0000900	000	00000	N	N	N	T
KSRS	01	KEVT	H	Z	0	0744	1228	000900	99989990	078183	04401420	LR	33		0000900	000	00000	N	N	N	T
KSRS	01	KEVT	H	R	0	0744	1228	000900	99989990	078183	04401420	LR	33		0000900	000	00000	N	N	N	T
LEM	10		U	Z		0755	1034	000000	00000000	078183	04131900	P	07	+E	0001050	017	-0006	Y	Y	N	N
PHC	10		U	Z		0776	2276	000000	00000000	078183	04133400	P	07	E	0000000	000	00450	N	N	N	N
ALK	20	TNAK	H	Z	0	0789	1993	078183	04131650	078183	04133650	P	07		0000000	000	00000	N	N	N	Y
ALK	20	TNAK	H	Z		0789	1993	000000	00000000	078183	04133720	P	07		0000675	011	00054	Y	Y	N	N
ALK	20	NJAK	H	Z		0819	2129	000000	00000000	078183	04135250	P	07		0000383	012	-0016	Y	Y	N	N
ALK	20	NJAK	H	Z	0	0819	2129	078183	04133250	078183	04135250	P	07		0000000	000	00000	N	N	N	Y
ALK	20	BFAK	H	Z		0822	2080	000000	00000000	078183	04135370	P	07		0001516	014	-0069	Y	Y	N	N
ALK	01	BFAK	H	A	0	0822	2080	000060	99989990	078183	04135430	P	07		0000240	000	00000	N	N	N	T
ALK	20	BFAK	H	Z	0	0822	2080	078183	04133430	078183	04135430	P	07		0000000	000	00000	N	N	N	Y
ALK	01	BFAK	H	A	0	0822	2080	000060	99989990	078183	04240570	S	26		0000240	000	00000	N	N	N	T
ALK	01	BFAK	H	A	0	0822	2080	000900	99989990	078183	04364920	LQ	34		0000900	000	00000	N	N	N	T
ALK	01	BFAK	H	A	0	0822	2080	000900	99989990	078183	04445270	LR	33		0000900	000	00000	N	N	N	T
ALK	20	UCAK	H	Z		0821	2013	000000	00000000	078183	04135390	P	07		0000405	011	-0028	Y	Y	N	N
ALK	20	UCAK	H	Z	0	0821	2013	078183	04133410	078183	04135410	P	07		0000000	000	00000	N	N	N	Y
ANMO	01		G	A	0	0820	2459	000060	99989990	078183	04135410	P	07		0000240	000	00000	N	N	N	T
ANMO	20		H	Z	0	0820	2459	000000	99989990	078183	04135410	P	07		0000000	000	00000	N	N	N	T
ANMO	01		G	A	0	0820	2459	000060	99989990	078183	04240360	S	26		0000240	000	00000	N	N	N	T
ANMO	01		G	A	0	0820	2459	000900	99989990	078183	04365870	LQ	34		0000900	000	00000	N	N	N	T
ANMO	01		G	A	0	0820	2459	000900	99989990	078183	04445840	LR	33		0000900	000	00000	N	N	N	T
PWY	20	P999	H	Z		0832	2429	000000	00000000	078183	04135970	P	07		0000120	009	-0067	Y	Y	N	N
PWY	20	P999	H	Z	0	0832	2429	000020	99989990	078183	04140030	P	07		0000060	000	00000	N	N	N	T
PWY	01	PWLP	H	D	0	0832	2429	078183	04130000	078183	04140030	P	07		0000000	000	00000	N	N	N	Y
PWY	20	PWSP	H	Z	0	0832	2429	078183	04134030	078183	04140030	P	07		0000000	000	00000	N	N	N	Y
PWY	20	P999	H	Z		0832	2429	000000	00000000	078183	04171150	PP	06		0000000	000	00070	N	N	N	N
PWY	20	PWSP	H	D	0	0832	2429	078183	04235570	078183	04241570	S	26		0000000	000	00000	N	N	N	Y
PWY	01	PWLP	H	D	0	0832	2429	078183	04231500	078183	04241570	S	26		0000000	000	00000	N	N	N	Y
PWY	20	P999	H	Z		0832	2429	000000	00000000	078183	04320990	PKPCD	16		0000000	000	00110	N	N	N	N
PWY	01	PWLP	H	A	0	0832	2429	078183	04225300	078183	04375390	LQ	34		0000000	000	00000	N	N	N	Y
PWY	01	PWLP	H	A	0	0832	2429	078183	04305600	078183	04455610	LR	33		0000000	000	00000	N	N	N	Y
GUMO	20		H	Z	0	0836	1068	000000	99989990	078183	04140230	P	07		0000000	000	00000	N	N	N	T
GUMO	01		G	A	0	0836	1068	000060	99989990	078183	04140230	P	07		0000240	000	00000	N	N	N	T
GUMO	01		G	A	0	0836	1068	000060	99989990	078183	04241940	S	26		0000240	000	00000	N	N	N	T
GUMO	01		G	A	0	0836	1068	000900	99989990	078183	04374970	LQ	34		0000900	000	00000	N	N	N	T

```
GUMO     01       G A 0 0836 1068 000900 99989990 078183 04455650 LR      33     0000900 000 00000 N N N T
ALK      20 CNAK  H Z 0 0850 2101 078183 04134860 078183 04140860 P       07     0000000 000 00000 N N N Y
ALK      20 CNAK  H Z   0850 2101 000000 00000000 078183 04140900 P       07     0000700 012 00028 Y Y N N
SES      10       U Z   0859 2412 000000 00000000 078183 04141200 P       07  E  0002330 010 -0128 Y Y N N
EDM      10       U Z   0860 2391 000000 00000000 078183 04141790 P       07 +I  0000000 000 00390 N N N N
INK      10       U Z   0881 2205 000000 00000000 078183 04142600 P       07  E  0001010 010 00240 N N N N
YKA      10 Y057  U Z   0903 2378 000000 00000000 078183 04143860 P       07     0000728 010 00440 N N N N
YKC      10       U Z   0904 2379 000000 00000000 078183 04144190 .PP     04  E  0000000 000 -0870 N N N N
FFC      10       U Z   0927 2483 000000 00000000 078183 04144700 P       07  E  0001660 016 00148 Y Y N N
MBC      10       U Z   0967 2341 000000 00000000 078183 04150250 P       07  E  0000360 008 -0078 Y Y N N
LHC      10       U Z   0985 2575 000000 00000000 078183 04151300 P       07  E  0000000 000 00105 Y N N N
RES      10       U Z   1016 2572 000000 00000000 078183 04152600 P       07  E  0000370 010 00008 Y Y N N
ZOBO     01       G A 0 1021 2507 000060 99989990 078183 04152970 P       07     0000240 000 00000 N N N T
ZOBO     20       H Z 0 1021 2507 000000 99989990 078183 04152970 P       07     0000000 000 00000 N N N T
ZOBO     01       G A 0 1021 2507 000060 99989990 078183 04270350 S       26     0000240 000 00000 N N N T
ZOBO     01       G A 0 1021 2507 000900 99989990 078183 04445710 LQ      34     0000900 000 00000 N N N T
ZOBO     01       G A 0 1021 2507 000900 99989990 078183 04550110 LR      33     0000900 000 00000 N N N T
MAIO     01       G A 0 1266 0812 000060 99989990 078183 04203650 PKPDF   13     0000240 000 00000 N N N T
MAIO     20       H Z 0 1266 0812 000000 99989990 078183 04203650 PKPDF   13     0000000 000 00000 N N N T
MAIO     01       G A 0 1266 0812 000060 99989990 078183 04273650 SKSAC   24     0000240 000 00000 N N N T
MAIO     01       G A 0 1266 0812 000900 99989990 078183 05002840 LQ      34     0000900 000 00000 N N N T
MAIO     01       G A 0 1266 0812 000900 99989990 078183 05120230 LR      33     0000900 000 00000 N N N T
NAO      10 C3UU  H Z 0 1333 0093 000020 00000000 078183 04204830 PKPDF   13     0000060 000 00000 N N N T
NAO      10 C3UU  H Z   1333 0093 000000 00000000 078183 04204840 PKPDF   13     0000000 000 00001 Y N N N
NAO      01 NEVT  H D 0 1335 0091 078183 04194800 078183 04204880 PKPDF   13     0000000 000 00000 N N N Y
NAO      10 C3UU  H Z   1333 0093 000000 00000000 078183 04231540 PP      06     0000000 000 00000 N N N N
NAO      01 NEVT  H D 0 1335 0091 078183 04265400 078183 04275400 SKSDF   25     0000000 000 00000 N N N Y
NAO      01 NEVT  H T 0 1335 0091 078183 04501800 078183 05051840 LQ      34     0000000 000 00000 N N N Y
NAO      01 NEVT  H Z 0 1335 0091 078183 05021200 078183 05171240 LR      33     0000000 000 00000 N N N Y
NAO      01 NEVT  H R 0 1335 0091 078183 05021200 078183 05171240 LR      33     0000000 000 00000 N N N Y
NAO      01 N01B  H A 0 1335 0085 078183 04194800 078183 04204880 PKPDF   13     0000000 000 00000 N N N Y
NAO      01 N01B  H A 0 1335 0085 078183 04265400 078183 04275400 SKSDF   25     0000000 000 00000 N N N Y
NAO      01 N01B  H A 0 1335 0085 078183 04501900 078183 05051970 LQ      34     0000000 000 00000 N N N Y
NAO      01 N01B  H A 0 1335 0085 078183 05021400 078183 05171400 LR      33     0000000 000 00000 N N N Y
COP      10       U Z   1387 0118 000000 00000000 078183 04205000 PKPDF   13  E  0000000 000 -0850 N N N N
)
000000000 000000 00000000 0000 000     00000   000000   000 000 000   00000 00000 0000          000 000 00
000 000 00 000                          000 034
ALK      20 UCAK  H Z   0000 0000 000000 00000000 078183 02412870         21     0000000 000 00000       N
PWY      20 P999  H Z   0000 0000 000000 00000000 078183 02440750         21     0000000 000 00000       N
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PWY     20 P999 H Z   0000 0000 000000 00000000 078183 02484090        21    0000000 000 00000       N
ALK     20 CNAK H Z   0000 0000 000000 00000000 078183 02491850        21    0000000 000 00000       N
ALK     20 UCAK H Z   0000 0000 000000 00000000 078183 02491850        21    0000000 000 00000       N
ALK     20 ATAK H Z   0000 0000 000000 00000000 078183 02492030        21    0000000 000 00000       N
PWY     20 P999 H Z   0000 0000 000000 00000000 078183 02495430        21    0000000 000 00000       N
NAO     10 N197 H Z   0870 3051 000000 00000000 078183 02514080        21    0000000 000 00000       N
ALK     20 UCAK H Z   0000 0000 000000 00000000 078183 02580970        21    0000000 000 00000       N
PWY     20 P999 H Z   0000 0000 000000 0000 000 078183 02582520        21    0000000 000 00000       N
FCC     10      U Z   0000 0000 000000 00000000 078183 02583190 P      07 -E 0000000 000 00000       N
MBC     10      U Z   0000 0000 000000 00000000 078183 03004000 .PP    04    0000000 000 00000       N
ALK     20 UCAK H Z   0000 0000 000000 00000000 078183 03004630        21    0000000 000 00000       N
ALK     20 UCAK H Z   0000 0000 000000 00000000 078183 03005470        21    0000000 000 00000       N
NAO     10 N224 H Z   0387 2519 000000 00000000 078183 03011580        21    0000000 000 00000       N
NAO     10 N086 H Z   0775 2681 000000 00000000 078183 03012410        21    0000000 000 00000       N
YKA     10 Y050 U Z   0683 1350 000000 00000000 078183 03012850 P      07    0000170 010 00000       N
NAO     10 N190 H Z   0243 0516 000000 00000000 078183 03014880        21    0000000 000 00000       N
PWY     20 P999 H Z   0000 0000 000000 00000000 078183 03114610        21    0000000 000 00000       N
YKA     10 Y132 U Z   0248 3150 000000 00000000 078183 03141060 P      07    0000149 010 00000       N
ALK     20 TNAK H Z   0000 0000 000000 00000000 078183 03260390        21    0000000 000 00000       N
ALK     20 UCAK H Z   0000 0000 000000 00000000 078183 03265070        21    0000000 000 00000       N
NAO     10 N191 H Z   0680 0264 000000 00000000 078183 03315330        21    0000000 000 00000       N
NAO     10 N097 H Z   0427 0994 000000 00000000 078183 03415460        21    0000000 000 00000       N
PWY     20 P999 H Z   0000 0000 000000 00000000 078183 03424530        21    0000000 000 00000       N
ALK     20 UCAK H Z   0000 0000 000000 00000000 078183 03450510        21    0000000 000 00000       N
NAO     10 N135 H Z   0286 2197 000000 00000000 078183 03535260        21    0000000 000 00000       N
ALK     20 UCAK H Z   0000 0000 000000 00000000 078183 03545710        21    0000000 000 00000       N
NAO     10 N072 H Z   0846 2767 000000 00000000 078183 03560960        21    0000000 000 00000       N
ALK     20 NJAK H Z   0000 0000 000000 00000000 078183 03571130        21    0000000 000 00000       N
ALK     20 CNAK H Z   0000 0000 000000 00000000 078183 03571130        21    0000000 000 00000       N
ALK     20 UCAK H Z   0000 0000 000000 00000000 078183 03571130        21    0000000 000 00000       N
ALK     20 UCAK H Z   0000 0000 000000 00000000 078183 04015610        21    0000000 000 00000       N
ALK     20 UCAK H Z   0000 0000 000000 00000000 078183 04022670        21    0000000 000 00000       N
)
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E.2 ASPDET, 1-3 July 1978 SPDET Map

This section of Appendix E contains a portion of the %TOP.SDAC.VELANET.SPDET.Y1978.M07 file which was created and stored on the Datacomputer by the SWF-D program SPDET-mapping module. The RDC program was used to generate the listing shown here; the SPDET data was read through the ASPDET PORT into a local Tenex file.

The ASPDET PORT field names are used below as column headings. The first three columns designate the SRO station and its relationship, in time, to the other detections in the file. These are: the site name (STA), the relative position of the site's readings within the day (STANDEX), and the relative position of the detection in the monthly list (unlabeled).

The next three columns define the starting date and time of the detection, and the last three columns specify the corresponding set of information for the end of the recorded segment.

INDEX		SIA	SINDEX	SDATE	STIME	EINDEX	EDATE	ETIME
00001	07	MAIO	00001	078182	02515100	01863	078182	03225300
00002	07	MAIO	01864	078182	04035300	03726	078182	04345500
00003	07	MAIO	03727	078182	13112500	03776	078182	13121400
00004	07	MAIO	03777	078182	14321400	03826	078182	14330300
00005	07	MAIO	03827	078182	19370300	03925	078182	19384100
00006	07	MAIO	03926	078182	20341100	03975	078182	20350000
00007	07	MAIO	03976	078182	21100000	04025	078182	21104900
00008	07	MAIO	04026	078182	21221900	04075	078182	21230800
00009	07	MAIO	04076	078182	21273800	04125	078182	21282700
00010	07	MAIO	04126	078182	23132700	04322	078182	23164300
00011	07	MAIO	04323	078182	23181300	04372	078182	23190200
00012	07	MAIO	04373	078182	23213200	04422	078182	23222100
00013	08	MAJO	00001	078182	03363203	00050	078182	03372103
00014	08	MAJO	00051	078182	03372103	00247	078182	03403703
00015	08	MAJO	00248	078182	06090703	00346	078182	06104503
00016	08	MAJO	00347	078182	06521503	00396	078182	06530403
00017	08	MAJO	00397	078182	08583403	00642	078182	09023903
00018	08	MAJO	00643	078182	09120903	00741	078182	09134703
00019	08	MAJO	00742	078182	11501703	00938	078182	11533303
00020	08	MAJO	00939	078182	15343303	01086	078182	15370003
00021	08	MAJO	01087	078182	18263003	01332	078182	18303503
00022	08	MAJO	01333	078182	18360503	01431	078182	18374303
00023	08	MAJO	01432	078182	19054303	01530	078182	19072103
00024	08	MAJO	01531	078182	19422103	01580	078182	19431003
00025	01	BOCO	00001	078182	08550301	02157	078182	09305901
00026	01	BOCO	02158	078182	11511801	02207	078182	11520701
00027	01	BOCO	02208	078182	18243701	02257	078182	18252601
00028	01	BOCO	02258	078182	18252601	02307	078182	18261501
00029	01	BOCO	02308	078182	18261501	04219	078182	18580601
00030	02	NWAO	00001	078182	13101602	00050	078182	13110502
00031	03	ZOBO	00001	078182	00100001	00099	078182	00122801
00032	03	ZOBO	00100	078182	00495801	00149	078182	00504701
00033	03	ZOBO	00150	078182	01311701	00297	078182	01334401
00034	03	ZOBO	00298	078182	01404401	00396	078182	01422201
00035	03	ZOBO	00397	078182	01482201	00642	078182	01522701
00036	03	ZOBO	00643	078182	01562701	00692	078182	01571601
00037	03	ZOBO	00693	078182	02051601	00742	078182	02060501
00038	03	ZOBO	00743	078182	03463501	00792	078182	03472401
00039	03	ZOBO	00793	078182	03512401	00891	078182	03530201
00040	03	ZOBO	00892	078182	04330201	00990	078182	04344001
00041	03	ZOBO	00991	078182	05004001	01187	078182	05035601
00042	03	ZOBO	01188	078182	05225601	01286	078182	05243401
00043	03	ZOBO	01287	078182	06323401	01336	078182	06332301
00044	03	ZOBO	01337	078182	08305301	01386	078182	08314201
00045	03	ZOBO	01387	078182	08591201	03347	078182	09315201
00046	03	ZOBO	03348	078182	12265201	03446	078182	12283001
00047	03	ZOBO	03447	078182	13150001	03594	078182	13172701
00048	03	ZOBO	03595	078182	14022701	03644	078182	14031601

INDEX		SIA	SINDEX	SDATE	STIME	EINDEX	EDATE	ETIME
00049	03	ZOBO	03645	078182	17001601	03743	078182	17015401
00050	03	ZOBO	03744	078182	17175401	03793	078182	17184301
00051	03	ZOBO	03794	078182	17464301	03892	078182	17482101
00052	03	ZOBO	03893	078182	17555101	03942	078182	17564001
00053	03	ZOBO	03943	078182	18114001	03992	078182	18122901
00054	03	ZOBO	03993	078182	18282901	04189	078182	18314501
00055	03	ZOBO	04190	078182	20171501	04239	078182	20180401
00056	03	ZOBO	04240	078182	20210401	04289	078182	20215301
00057	03	ZOBO	04290	078182	20372301	04388	078182	20390101
00058	03	ZOBO	04389	078182	20523101	04487	078182	20540901
00059	03	ZOBO	04488	078182	21210901	04537	078182	21215801
00060	03	ZOBO	04538	078182	22265801	04636	078182	22283601
00061	04	ANMO	00001	078182	00554401	00148	078182	00581101
00062	04	ANMO	00149	078182	01331101	00198	078182	01340001
00063	04	ANMO	00199	078182	03450001	00248	078182	03454901
00064	04	ANMO	00249	078182	03471901	00445	078182	03503501
00065	04	ANMO	00446	078182	06063501	00495	078182	06072401
00066	04	ANMO	00496	078182	09002401	00594	078182	09020201
00067	04	ANMO	00595	078182	09020201	00742	078182	09042901
00068	04	ANMO	00743	078182	09042901	00792	078182	09051801
00069	04	ANMO	00793	078182	09481801	00842	078182	09490701
00070	04	ANMO	00843	078182	10310701	00941	078182	10324501
00071	04	ANMO	00942	078182	13001501	00991	078182	13010401
00072	04	ANMO	00992	078182	22090401	01286	078182	22135801
00073	05	CTAO	00001	078182	09404800	01863	078182	10115000
00074	05	CTAO	01864	078182	10245000	03726	078182	10555200
00075	06	CHTO	00001	078182	01430702	00050	078182	01435602
00076	06	CHTO	00051	078182	02142602	00100	078182	02151502
00077	06	CHTO	00101	078182	03394502	00150	078182	03403402
00078	06	CHTO	00151	078182	04133402	00200	078182	04142302
00079	06	CHTO	00201	078182	04485302	00250	078182	04494202
00080	06	CHTO	00251	078182	06174202	00300	078182	06183102
00081	06	CHTO	00301	078182	09133102	00350	078182	09142002
00082	06	CHTO	00351	078182	09142002	00449	078182	09155802
00083	06	CHTO	00450	078182	09465802	00499	078182	09474702
00084	06	CHTO	00500	078182	10311702	00549	078182	10320602
00085	06	CHTO	00550	078182	11180602	00599	078182	11185502
00086	06	CHTO	00600	078182	16005502	00649	078182	16014402
00087	06	CHTO	00650	078182	16454402	00748	078182	16472202
00088	06	CHTO	00749	078182	17092202	00798	078182	17101102
00089	06	CHTO	00799	078182	18201102	00848	078182	18210002
00090	06	CHTO	00849	078182	18430002	00898	078182	18434902
00091	06	CHTO	00899	078182	19064902	00948	078182	19073802
00092	06	CHTO	00949	078182	19313802	00998	078182	19322702
00093	06	CHTO	00999	078182	19322702	01146	078182	19345402
00094	06	CHTO	01147	078182	19442402	01196	078182	19451302
00095	06	CHTO	01197	078182	19551302	01246	078182	19560202
00096	06	CHTO	01247	078182	20140202	01296	078182	20145102

INDEX	SIA	SINDEX	SDATE	STIME	EINDEX	EDATE	ETIME
00097	06 CHTO	01297	078182	20325102	01346	078182	20334002
00098	06 CHTO	01347	078182	22021002	01396	078182	22025902
00099	06 CHTO	01397	078182	22342902	01495	078182	22360702
00100	06 CHTO	01496	078182	22553702	01545	078182	22562602
00101	06 CHTO	01546	078182	23235602	01595	078182	23244502
00102	06 CHTO	01596	078182	23464502	01645	078182	23473402
00103	01 BOCO	00001	078183	01124701	01814	078183	01430001
00104	01 BOCO	01815	078183	02493201	01913	078183	02511001
00105	01 BOCO	01914	078183	02514801	02159	078183	02555301
00106	01 BOCO	02160	078183	02555301	04022	078183	03265501
00107	01 BOCO	04023	078183	13192401	04072	078183	13201301
00108	01 BOCO	04073	078183	22061801	04171	078183	22075601
00109	01 BOCO	04172	078183	22395601	04319	078183	22422301
00110	02 NWAO	00001	078183	04113502	00050	078183	04122402
00111	02 NWAO	00051	078183	04122402	00100	078183	04131302
00112	03 ZOBO	00001	078183	01323601	00050	078183	01332501
00113	03 ZOBO	00051	078183	01592501	00149	078183	02010301
00114	03 ZOBO	00150	078183	02533301	01375	078183	03135801
00115	03 ZOBO	01376	078183	04522801	01425	078183	04531701
00116	03 ZOBO	01426	078183	05191701	01475	078183	05200601
00117	03 ZOBO	01476	078183	05443601	01623	078183	05470301
00118	03 ZOBO	01624	078183	07030301	01722	078183	07044101
00119	03 ZOBO	01723	078183	07104101	01772	078183	07113001
00120	03 ZOBO	01773	078183	08433001	01871	078183	08450801
00121	03 ZOBO	01872	078183	10160801	02117	078183	10201301
00122	03 ZOBO	02118	078183	10454301	02167	078183	10463201
00123	03 ZOBO	02168	078183	14020201	02266	078183	14034001
00124	03 ZOBO	02267	078183	14081001	02316	078183	14085901
00125	03 ZOBO	02317	078183	14145901	02415	078183	14163701
00126	03 ZOBO	02416	078183	15503701	02465	078183	15512601
00127	03 ZOBO	02466	078183	16393601	02564	078183	16413401
00128	03 ZOBO	02565	078183	18310401	03006	078183	18382501
00129	03 ZOBO	03007	078183	19492501	03203	078183	19524101
00130	03 ZOBO	03204	078183	23361101	03351	078183	23383801
00131	04 ANMO	00001	078183	01405801	00148	078183	01432501
00132	04 ANMO	00149	078183	02562501	00443	078183	03011901
00133	04 ANMO	00444	078183	04131901	00493	078183	04140801
00134	04 ANMO	00494	078183	04140801	00543	078183	04145701
00135	04 ANMO	00544	078183	04145701	01034	078183	04230701
00136	04 ANMO	01035	078183	04563701	01084	078183	04572601
00137	04 ANMO	01085	078183	07162601	01232	078183	07185301
00138	04 ANMO	01233	078183	07365301	01282	078183	07374201
00139	04 ANMO	01283	078183	08044201	01332	078183	08053101
00140	04 ANMO	01333	078183	10383101	01431	078183	10400901
00141	04 ANMO	01432	078183	12340901	01481	078183	12345801
00142	04 ANMO	01482	078183	13315801	01531	078183	13324701
00143	04 ANMO	01532	078183	13434701	01679	078183	13461401
00144	04 ANMO	01680	078183	13471401	01778	078183	13485201

INDEX	SIA	SINDEX	SDATE	STIME	EINDEX	EDATE	ETIME
00145	04 ANMO	01779	078183	14162201	01926	078183	14184901
00146	04 ANMO	01927	078183	15244901	01976	078183	15253801
00147	04 ANMO	01977	078183	15493801	02026	078183	15502701
00148	04 ANMO	02027	078183	16465701	02125	078183	16483501
00149	04 ANMO	02126	078183	17130501	02224	078183	17144301
00150	04 ANMO	02225	078183	18404301	02274	078183	18413201
00151	04 ANMO	02275	078183	21090201	02324	078183	21095101
00152	04 ANMO	02325	078183	22112101	02374	078183	22121001
00153	04 ANMO	02375	078183	23294001	02473	078183	23311801
00154	05 CTAO	00001	078183	04075200	01863	078183	04385400
00155	05 CTAO	01864	078183	13315400	03726	078183	14025600
00156	05 CTAO	03727	078183	16225600	05589	078183	16535800
00157	05 CTAO	05590	078183	16542800	07452	078183	17253000
00158	05 CTAO	07453	078183	17253000	11275	078183	18291200
00159	05 CTAO	11276	078183	18291200	11325	078183	18300100
00160	05 CTAO	11326	078183	18300100	13286	078183	19024100
00161	05 CTAO	13287	078183	19024100	14365	078183	19203900
00162	05 CTAO	14366	078183	19203900	16767	078183	20004000
00163	05 CTAO	16768	078183	20004000	20443	078183	21015500
00164	05 CTAO	20444	078183	21022500	24119	078183	22034000
00165	05 CTAO	24120	078183	22034000	27795	078183	23045500
00166	05 CTAO	27796	078183	23065500	27845	078183	23074400
00167	05 CTAO	27846	078183	23074400	30981	078183	23595900
00168	06 CHTO	00001	078183	00410402	00050	078183	00415302
00169	06 CHTO	00051	078183	00415302	00100	078183	00424202
00170	06 CHTO	00101	078183	00524202	00150	078183	00533102
00171	06 CHTO	00151	078183	01300102	00200	078183	01305002
00172	06 CHTO	00201	078183	02375002	00250	078183	02383902
00173	06 CHTO	00251	078183	02410902	00349	078183	02424702
00174	06 CHTO	00350	078183	02551702	00399	078183	02560602
00175	06 CHTO	00400	078183	02570602	00498	078183	02584402
00176	06 CHTO	00499	078183	03081402	00548	078183	03090302
00177	06 CHTO	00549	078183	03383302	00696	078183	03410002
00178	06 CHTO	00697	078183	04143002	01138	078183	04215102
00179	06 CHTO	01139	078183	04255102	01188	078183	04264002
00180	06 CHTO	01189	078183	04281002	01287	078183	04294802
00181	06 CHTO	01288	078183	04451802	01337	078183	04460702
00182	06 CHTO	01338	078183	04550702	01387	078183	04555602
00183	06 CHTO	01388	078183	05082602	01437	078183	05091502
00184	06 CHTO	01438	078183	05264502	01487	078183	05273402
00185	06 CHTO	01488	078183	05353402	01537	078183	05362302
00186	06 CHTO	01538	078183	05515302	01587	078183	05524202
00187	06 CHTO	01588	078183	06294202	01637	078183	06303102
00188	06 CHTO	01638	078183	06510102	01736	078183	06523902
00189	06 CHTO	01737	078183	07113902	01786	078183	07122802
00190	06 CHTO	01787	078183	07165802	01836	078183	07174702
00191	06 CHTO	01837	078183	07351702	01886	078183	07360602
00192	06 CHTO	01887	078183	08220602	01936	078183	08225502

INDEX	SIA	SINDEX	SDATE	STIME	EINDEX	EDATE	ETIME
00193	06 CHTO	01937	078183	08315502	01986	078183	08324402
00194	06 CHTO	01987	078183	08394402	02036	078183	08403302
00195	06 CHTO	02037	078183	08580302	02135	078183	08594102
00196	06 CHTO	02136	078183	09091102	02185	078183	09100002
00197	06 CHTO	02186	078183	09110002	02235	078183	09114902
00198	06 CHTO	02236	078183	09154902	02285	078183	09163802
00199	06 CHTO	02286	078183	09393802	02384	078183	09411602
00200	06 CHTO	02385	078183	09491602	02434	078183	09500502
00201	06 CHTO	02435	078183	10050502	02484	078183	10055402
00202	06 CHTO	02485	078183	10102402	02534	078183	10111302
00203	06 CHTO	02535	078183	10114302	02633	078183	10132102
00204	06 CHTO	02634	078183	10312102	02683	078183	10321002
00205	06 CHTO	02684	078183	10464002	02733	078183	10472902
00206	06 CHTO	02734	078183	10512902	02783	078183	10521802
00207	06 CHTO	02784	078183	11051802	02833	078183	11060702
00208	06 CHTO	02834	078183	11163702	02883	078183	11172602
00209	06 CHTO	02884	078183	11205602	02933	078183	11214502
00210	06 CHTO	02934	078183	11221502	02983	078183	11230402
00211	06 CHTO	02984	078183	12193402	03033	078183	12202302
00212	06 CHTO	03034	078183	12552302	03083	078183	12561202
00213	06 CHTO	03084	078183	13221202	03133	078183	13230102
00214	06 CHTO	03134	078183	13263102	03232	078183	13280902
00215	06 CHTO	03233	078183	13300902	03625	078183	13364102
00216	06 CHTO	03626	078183	13364102	03675	078183	13373002
00217	06 CHTO	03676	078183	13473002	03725	078183	13481902
00218	06 CHTO	03726	078183	14014902	03775	078183	14023802
00219	06 CHTO	03776	078183	14543802	03825	078183	14552702
00220	06 CHTO	03826	078183	14552702	03875	078183	14561602
00221	06 CHTO	03876	078183	14561602	04023	078183	14584302
00222	06 CHTO	04024	078183	14584302	05837	078183	15285602
00223	06 CHTO	05838	078183	15526602	05936	078183	15543402
00224	06 CHTO	05937	078183	15543402	05986	078183	15552302
00225	06 CHTO	05987	078183	15552302	06036	078183	15561202
00226	06 CHTO	06037	078183	16304202	06086	078183	16313102
00227	06 CHTO	06087	078183	16373102	06136	078183	16382002
00228	06 CHTO	06137	078183	17585002	06186	078183	17593902
00229	06 CHTO	06187	078183	19180902	06236	078183	19185802
00230	06 CHTO	06237	078183	19185802	06286	078183	19194702
00231	06 CHTO	06287	078183	19231702	06336	078183	19240602
00232	06 CHTO	06337	078183	20010602	06386	078183	20015502
00233	06 CHTO	06387	078183	21092502	06436	078183	21101402
00234	06 CHTO	06437	078183	21111402	06486	078183	21120302
00235	06 CHTO	06487	078183	21323302	06536	078183	21332202
00236	06 CHTO	06537	078183	21575202	07076	078183	22065102
00237	06 CHTO	07077	078183	23105102	07126	078183	23114002
00238	06 CHTO	07127	078183	23241002	07225	078183	23254802
00239	06 CHTO	07226	078183	23281802	07275	078183	23290702
00240	07 MAIO	00001	078183	00092100	00050	078183	00101000

INDEX		SIA	SINDEX	SDATE	STIME	EINDEX	EDATE	ETIME
00241	07	MAIO	00051	078183	02551000	01913	078183	03261200
00242	07	MAIO	01914	078183	03421200	03825	078183	04140300
00243	07	MAIO	03826	078183	04200300	03924	078183	04214100
00244	07	MAIO	03925	078183	09421100	03974	078183	09430000
00245	07	MAIO	03975	078183	10493000	04024	078183	10501900
00246	07	MAIO	04025	078183	12394900	04172	078183	12421600
00247	07	MAIO	04173	078183	13334600	04418	078183	13375100
00248	07	MAIO	04419	078183	13375100	04468	078183	13384000
00249	07	MAIO	04469	078183	21194000	04616	078183	21220700
00250	07	MAIO	04617	078183	21270700	04666	078183	21275600
00251	07	MAIO	04667	078183	21572600	04716	078183	21581500
00252	07	MAIO	04717	078183	22031500	04962	078183	22072000
00253	07	MAIO	04963	078183	22335000	05061	078183	22352800
00254	07	MAIO	05062	078183	22532800	05160	078183	22550600
00255	07	MAIO	05161	078183	22583600	05259	078183	23001400
00256	07	MAIO	05260	078183	23244400	05456	078183	23280000
00257	07	MAIO	05457	078183	23280000	05555	078183	23293800
00258	07	MAIO	05556	078183	23440800	05654	078183	23454600
00259	08	MAJO	00001	078183	03311003	00099	078183	03324803
00260	08	MAJO	00100	078183	04114803	00394	078183	04164203
00261	08	MAJO	00395	078183	07354203	02355	078183	08082203
00262	08	MAJO	02356	078183	08175203	04218	078183	08485403
00263	08	MAJO	04219	078183	09055403	06081	078183	09365603
00264	08	MAJO	06082	078183	09392603	07944	078183	10102803
00265	08	MAJO	07945	078183	10102803	09807	078183	10413003
00266	08	MAJO	09808	078183	11043003	11670	078183	11353203
00267	08	MAJO	11671	078183	11353203	13533	078183	12063403
00268	08	MAJO	13534	078183	12250403	15396	078183	12560603
00269	08	MAJO	15397	078183	12583603	15495	078183	13001403
00270	08	MAJO	15496	078183	13001403	15594	078183	13015203
00271	08	MAJO	15595	078183	13022203	15693	078183	13040003
00272	08	MAJO	15694	078183	13040003	15792	078183	13053803
00273	08	MAJO	15793	078183	13063803	15842	078183	13072703
00274	08	MAJO	15843	078183	13092703	16235	078183	13155903
00275	08	MAJO	16236	078183	13155903	16334	078183	13173703
00276	08	MAJO	16335	078183	13173703	16874	078183	13263603
00277	08	MAJO	16875	078183	13270603	18737	078183	13580803
00278	08	MAJO	18738	078183	14043803	20600	078183	14354003
00279	08	MAJO	20601	078183	14494003	22463	078183	15204203
00280	08	MAJO	22464	078183	15454203	26139	078183	16465703
00281	08	MAJO	26140	078183	17012703	28002	078183	17322903
00282	01	BOCO	00001	078184	04205201	00197	078184	04240801
00283	01	BOCO	00198	078184	08123801	00247	078184	08132701
00284	01	BOCO	00248	078184	08132701	02159	078184	08451801
00285	01	BOCO	02160	078184	10030601	02699	078184	10120501
00286	02	NWAO	00001	078184	01511302	00050	078184	01520202
00287	02	NWAO	00051	078184	03133202	00149	078184	03151002
00288	02	NWAO	00150	078184	03151002	00199	078184	03155902

INDEX	SIA	SINDEX	SDATE	STIME	EINDEX	EDATE	ETIME
00289	06 CTA0	00001	078184	00000000	00589	078184	00094800
00290	06 CTA0	00590	078184	00094800	00982	078184	00162000
00291	06 CTA0	00983	078184	00223300	01228	078184	00263800
00292	06 CTA0	01229	078184	01403100	01278	078184	01412000
00293	06 CTA0	01279	078184	01505000	01426	078184	01531700
00294	06 CTA0	01427	078184	02234700	01476	078184	02243600
00295	06 CTA0	01477	078184	03100600	01526	078184	03105500
00296	06 CTA0	01527	078184	04555500	01576	078184	04564400
00297	06 CTA0	01577	078184	06264400	01724	078184	06291100
00298	06 CTA0	01725	078184	07154100	01872	078184	07180800
00299	06 CTA0	01873	078184	09513800	01971	078184	09531600
00300	06 CTA0	01972	078184	10094600	02021	078184	10103500
00301	06 CTA0	02022	078184	10183500	02071	078184	10192400
00302	06 CTA0	02072	078184	10595400	02121	078184	11004300
00303	06 CTA0	02122	078184	12484300	02171	078184	12493200
00304	06 CTA0	02172	078184	14023200	02221	078184	14032100
00305	06 CTA0	02222	078184	14205100	02271	078184	14214000
00306	06 CTA0	02272	078184	14334000	02321	078184	14342900
00307	06 CTA0	02322	078184	15462900	02371	078184	15471800
00308	06 CTA0	02372	078184	16144800	02421	078184	16153700
00309	06 CTA0	02422	078184	16153700	02520	078184	16171500
00310	06 CTA0	02521	078184	16211500	02570	078184	16220400
00311	06 CTA0	02571	078184	17263400	02620	078184	17272300
00312	06 CTA0	02621	078184	17322300	02719	078184	17340100
00313	06 CTA0	02720	078184	17350100	02769	078184	17355000
00314	06 CTA0	02770	078184	18185000	02819	078184	18193900
00315	06 CTA0	02820	078184	19160900	02869	078184	19165800
00316	06 CTA0	02870	078184	20575800	02968	078184	20593600
00317	06 CTA0	02969	078184	23240600	03018	078184	23245500
00318	09 MAJ0	00001	078184	01175903	01863	078184	01490103
00319	09 MAJ0	01864	078184	01513103	03726	078184	02223303
00320	09 MAJ0	03727	078184	04103303	05589	078184	04413503
00321	09 MAJ0	05590	078184	04543503	05737	078184	04570203
00322	09 MAJ0	05738	078184	04570203	05836	078184	04584003
00323	09 MAJ0	05837	078184	04584003	07699	078184	05294203
00324	09 MAJ0	07700	078184	05334203	09562	078184	06044403
00325	09 MAJ0	09563	078184	06454403	11425	078184	07164603
00326	09 MAJ0	11426	078184	07281603	13288	078184	07591803
00327	09 MAJ0	13289	078184	08051803	13436	078184	08074503
00328	09 MAJ0	13437	078184	12514503	15299	078184	13224703
00329	09 MAJ0	15300	078184	14234703	17162	078184	14544903
00330	09 MAJ0	17163	078184	15434903	20838	078184	16450403
00331	09 MAJ0	20839	078184	16450403	21133	078184	16495803
00332	09 MAJ0	21134	078184	16595803	21183	078184	17004703
00333	09 MAJ0	21184	078184	17004703	21282	078184	17022503
00334	09 MAJ0	21283	078184	17022503	21332	078184	17031403
00335	09 MAJ0	21333	078184	17111403	21382	078184	17120303
00336	09 MAJ0	21383	078184	17120303	23245	078184	17430503

INDEX	SIA	SINDEX	SDATE	STIME	EINDEX	EDATE	ETIME
00337	09 MAJO	23246	078184	18063503	23442	078184	18095103
00338	09 MAJO	23443	078184	18132103	23688	078184	18172603
00339	09 MAJO	23689	078184	18202603	23934	078184	18243103
00340	09 MAJO	23935	078184	18243103	26042	078184	18593803
00341	09 MAJO	26043	078184	19323803	26092	078184	19332703
00342	09 MAJO	26093	078184	21015703	26191	078184	21033503
00343	09 MAJO	26192	078184	21033503	26535	078184	21091803
00344	09 MAJO	26536	078184	21344803	26585	078184	21353703
00345	09 MAJO	26586	078184	21353703	26635	078184	21362603
00346	09 MAJO	26636	078184	21362603	26685	078184	21371503
00347	09 MAJO	26686	078184	21411503	26735	078184	21420403
00348	09 MAJO	26736	078184	21423403	26785	078184	21432303
00349	09 MAJO	26786	078184	21432303	27717	078184	21585403
00350	09 MAJO	27718	078184	21585403	29678	078184	22313403
00351	09 MAJO	29679	078184	22373403	29728	078184	22382303
00352	09 MAJO	29729	078184	22502303	29778	078184	22511203
00353	09 MAJO	29779	078184	23031203	29877	078184	23045003
00354	09 MAJO	29878	078184	23255003	29976	078184	23272803
00355	03 ZOBO	00001	078184	01450801	00197	078184	01482401
00356	03 ZOBO	00198	078184	01535401	00296	078184	01553201
00357	03 ZOBO	00297	078184	01560201	00591	078184	02005601
00358	03 ZOBO	00592	078184	02042601	01033	078184	02114701
00359	03 ZOBO	01034	078184	03104701	01230	078184	03140301
00360	03 ZOBO	01231	078184	03213301	01378	078184	03240001
00361	03 ZOBO	01379	078184	03313001	01477	078184	03330801
00362	03 ZOBO	01478	078184	04153801	01576	078184	04171601
00363	03 ZOBO	01577	078184	04234601	01822	078184	04275101
00364	03 ZOBO	01823	078184	05022101	01921	078184	05035901
00365	03 ZOBO	01922	078184	05035901	01971	078184	05044801
00366	03 ZOBO	01972	078184	05101801	02070	078184	05115601
00367	03 ZOBO	02071	078184	05185601	02120	078184	05194501
00368	03 ZOBO	02121	078184	05194501	02219	078184	05212301
00369	03 ZOBO	02220	078184	05242301	02318	078184	05260101
00370	03 ZOBO	02319	078184	05280101	02809	078184	05361101
00371	03 ZOBO	02810	078184	05404101	02859	078184	05413001
00372	03 ZOBO	02860	078184	05573001	02909	078184	05581901
00373	03 ZOBO	02910	078184	06154901	03008	078184	06172701
00374	03 ZOBO	03009	078184	06265701	03058	078184	06274601
00375	03 ZOBO	03059	078184	07201601	03255	078184	07233201
00376	03 ZOBO	03256	078184	09580201	03305	078184	09585101
00377	03 ZOBO	03306	078184	10015101	04041	078184	10140601
00378	03 ZOBO	04042	078184	10240601	04140	078184	10254401
00379	03 ZOBO	04141	078184	10581401	04288	078184	11004101
00380	03 ZOBO	04289	078184	11224101	04338	078184	11233001
00381	03 ZOBO	04339	078184	11380001	04486	078184	11402701
00382	03 ZOBO	04487	078184	12005701	04585	078184	12023501
00383	03 ZOBO	04586	078184	12123501	04782	078184	12155101
00384	03 ZOBO	04783	078184	12185101	04832	078184	12194001

INDEX		SIA	SINDEX	SDATE	SITME	EINDEX	EDATE	EITME
00385	03	ZOBO	04833	078184	14034001	04882	078184	14042901
00386	03	ZOBO	04883	078184	14265901	04981	078184	14283701
00387	03	ZOBO	04982	078184	14393701	05129	078184	14420401
00388	03	ZOBO	05130	078184	14550401	05228	078184	14564201
00389	03	ZOBO	05229	078184	16374201	05376	078184	16400901
00390	03	ZOBO	05377	078184	18390901	05524	078184	18413601
00391	03	ZOBO	05525	078184	19233601	05623	078184	19251401
00392	03	ZOBO	05624	078184	19381401	05869	078184	19421901
00393	03	ZOBO	05870	078184	20244901	05968	078184	20262701
00394	03	ZOBO	05969	078184	21195701	06018	078184	21204601
00395	03	ZOBO	06019	078184	21234601	06068	078184	21243501
00396	03	ZOBO	06069	078184	22260501	06167	078184	22274301
00397	04	ANMO	00001	078184	00261801	00197	078184	00293401
00398	04	ANMO	00198	078184	01010401	00247	078184	01015301
00399	04	ANMO	00248	078184	01502301	00297	078184	01511201
00400	04	ANMO	00298	078184	01511201	00445	078184	01533901
00401	04	ANMO	00446	078184	02030901	00495	078184	02035801
00402	04	ANMO	00496	078184	02055801	00545	078184	02064701
00403	04	ANMO	00546	078184	03011701	00595	078184	03020601
00404	04	ANMO	00596	078184	03043601	00694	078184	03061401
00405	04	ANMO	00695	078184	03151401	00793	078184	03165201
00406	04	ANMO	00794	078184	03182201	00843	078184	03191101
00407	04	ANMO	00844	078184	04234101	01236	078184	04301301
00408	04	ANMO	01237	078184	05024301	01286	078184	05033201
00409	04	ANMO	01287	078184	05133201	01336	078184	05142101
00410	04	ANMO	01337	078184	05275101	01386	078184	05284001
00411	04	ANMO	01387	078184	05314001	01583	078184	05345601
00412	04	ANMO	01584	078184	05535601	01633	078184	05544501
00413	04	ANMO	01634	078184	06371501	01732	078184	06385301
00414	04	ANMO	01733	078184	06592301	01782	078184	07001201
00415	04	ANMO	01783	078184	09354201	01832	078184	09363101
00416	04	ANMO	01833	078184	09363101	01882	078184	09372001
00417	04	ANMO	01883	078184	09385001	01981	078184	09402801
00418	04	ANMO	01982	078184	10085801	02080	078184	10103601
00419	04	ANMO	02081	078184	10173601	02179	078184	10191401
00420	04	ANMO	02180	078184	10514401	02229	078184	10523301
00421	04	ANMO	02230	078184	11500301	02279	078184	11505201
00422	04	ANMO	02280	078184	12195201	02329	078184	12204101
00423	04	ANMO	02330	078184	12484101	02379	078184	12493001
00424	04	ANMO	02380	078184	14330001	02478	078184	14343801
00425	04	ANMO	02479	078184	14483801	02528	078184	14492701
00426	04	ANMO	02529	078184	14492701	02578	078184	14501601
00427	04	ANMO	02579	078184	20174601	02677	078184	20192401
00428	04	ANMO	02678	078184	20205401	02923	078184	20245901
00429	04	ANMO	02924	078184	20562901	02973	078184	20571801
00430	04	ANMO	02974	078184	21034801	03072	078184	21052601
00431	04	ANMO	03073	078184	21055601	03122	078184	21064501
00432	04	ANMO	03123	078184	21131501	03270	078184	21154201

INDEX		SITE	SINDEX	SDATE	STIME	EINDEX	EDATE	ETIME
00433	04	ANMO	03271	078184	21154201	03320	078184	21163101
00434	04	ANMO	03321	078184	21390101	03419	078184	21403901
00435	04	ANMO	03420	078184	22300901	03616	078184	22332501
00436	05	CHTO	00001	078184	00270702	00099	078184	00284502
00437	05	CHTO	00100	078184	00364502	00149	078184	00373402
00438	05	CHTO	00150	078184	00373402	00199	078184	00382302
00439	05	CHTO	00200	078184	01422302	00249	078184	01431202
00440	05	CHTO	00250	078184	01431202	00299	078184	01440102
00441	05	CHTO	00300	078184	01460102	00398	078184	01473902
00442	05	CHTO	00399	078184	01520902	00497	078184	01534702
00443	05	CHTO	00498	078184	01534702	00547	078184	01543602
00444	05	CHTO	00548	078184	01563602	00597	078184	01572502
00445	05	CHTO	00598	078184	02592502	00647	078184	03001402
00446	05	CHTO	00648	078184	03094402	00697	078184	03103302
00447	05	CHTO	00698	078184	03103302	01139	078184	03175402
00448	05	CHTO	01140	078184	03175402	01483	078184	03233702
00449	05	CHTO	01484	078184	04260702	01533	078184	04265602
00450	05	CHTO	01534	078184	04372602	01877	078184	04430902
00451	05	CHTO	01878	078184	06223902	03789	078184	06543002
00452	05	CHTO	03790	078184	06570002	03839	078184	06574902
00453	05	CHTO	03840	078184	06574902	03889	078184	06583802
00454	05	CHTO	03890	078184	07210802	03939	078184	07215702
00455	05	CHTO	03940	078184	08492702	04038	078184	08510502
00456	05	CHTO	04039	078184	09310502	04088	078184	09315402
00457	05	CHTO	04089	078184	09332402	04187	078184	09350202
00458	05	CHTO	04188	078184	09390202	04335	078184	09412902
00459	05	CHTO	04336	078184	10122902	04434	078184	10140702
00460	05	CHTO	04435	078184	10373702	04484	078184	10382602
00461	05	CHTO	04485	078184	10462602	04534	078184	10471502
00462	05	CHTO	04535	078184	11054502	04682	078184	11081202
00463	05	CHTO	04683	078184	11081202	06594	078184	11400302
00464	05	CHTO	06595	078184	11430302	06644	078184	11435202
00465	05	CHTO	06645	078184	11435202	06694	078184	11444102
00466	05	CHTO	06695	078184	11444102	06744	078184	11453002
00467	05	CHTO	06745	078184	13230002	06794	078184	13234902
00468	05	CHTO	06795	078184	14044902	06844	078184	14053802
00469	05	CHTO	06845	078184	14273802	06894	078184	14282702
00470	05	CHTO	06895	078184	14432702	06944	078184	14441602
00471	05	CHTO	06945	078184	16354602	06994	078184	16363502
00472	05	CHTO	06995	078184	17013502	07044	078184	17022402
00473	05	CHTO	07045	078184	17035402	07143	078184	17053202
00474	05	CHTO	07144	078184	17153202	07193	078184	17162102
00475	05	CHTO	07194	078184	17285102	07292	078184	17302902
00476	05	CHTO	07293	078184	17405902	07391	078184	17423702
00477	05	CHTO	07392	078184	18110702	07441	078184	18115602
00478	05	CHTO	07442	078184	19215602	07540	078184	19233402
00479	05	CHTO	07541	078184	19520402	07590	078184	19525302
00480	05	CHTO	07591	078184	19525302	07983	078184	19592502

INDEX	SIA	SINDEX	SDATE	STIME	EINDEX	EDATE	ETIME
00481	05 CHTO	07984	078184	19595502	08033	078184	20004402
00482	05 CHTO	08034	078184	20124402	08181	078184	20151102
00483	05 CHTO	08182	078184	20191102	08280	078184	20204902
00484	05 CHTO	08281	078184	20214902	08330	078184	20223802
00485	05 CHTO	08331	078184	20340802	08380	078184	20345702
00486	05 CHTO	08381	078184	20432702	08430	078184	20441602
00487	05 CHTO	08431	078184	20444602	08480	078184	20453502
00488	05 CHTO	08481	078184	20510502	08530	078184	20515402
00489	05 CHTO	08531	078184	21005402	08580	078184	21014302
00490	05 CHTO	08581	078184	21034302	09218	078184	21142002
00491	07 NWAO	00001	078184	10085402	00050	078184	10094302
00492	07 NWAO	00051	078184	14441302	00100	078184	14450202
00493	07 NWAO	00101	078184	21010202	00199	078184	21024002
00494	08 MAIO	00001	078184	00161600	00050	078184	00170500
00495	08 MAIO	00051	078184	01370500	00541	078184	01451500
00496	08 MAIO	00542	078184	01494500	00689	078184	01521200
00497	08 MAIO	00690	078184	01551200	01033	078184	02005500
00498	08 MAIO	01034	078184	02005500	01230	078184	02041100
00499	08 MAIO	01231	078184	03134100	01280	078184	03143000
00500	08 MAIO	01281	078184	03430000	01330	078184	03434900
00501	08 MAIO	01331	078184	04324900	01772	078184	04401000
00502	08 MAIO	01773	078184	07264000	01871	078184	07281800
00503	08 MAIO	01872	078184	08514800	02117	078184	08555300
00504	08 MAIO	02118	078184	16055300	02265	078184	16082000
00505	08 MAIO	02266	078184	17322000	02413	078184	17344700
00506	08 MAIO	02414	078184	17424700	02463	078184	17433600
00507	08 MAIO	02464	078184	18250600	02513	078184	18255500
00508	08 MAIO	02514	078184	20515500	02563	078184	20524400
00509	08 MAIO	02564	078184	21004400	02662	078184	21022200
00510	08 MAIO	02663	078184	21095200	03006	078184	21153500
00511	08 MAIO	03007	078184	21300500	03056	078184	21305400
00512	08 MAIO	03057	078184	21435400	03106	078184	21444300
00513	08 MAIO	03107	078184	21451300	03156	078184	21460200
00514	08 MAIO	03157	078184	21470200	03206	078184	21475100
00515	08 MAIO	03207	078184	21505100	03256	078184	21514000
00516	08 MAIO	03257	078184	22004000	03306	078184	22012900
00517	08 MAIO	03307	078184	22375900	03356	078184	22384800
00518	08 MAIO	03357	078184	22544800	03455	078184	22562600
00519	08 MAIO	03456	078184	23212600	03505	078184	23221500

F. Sample SWF-D Operations Log Output

SWF-D has been programmed throughout to report on its activities; each task-handler logs its progress and records the names of the relevant seismic files, using their full Datacomputer pathnames, as they are read, written and created. Similarly for local Tenex files, the Tenex filenames are recorded.

The format of the file is. a date/time stamp followed by one space, followed by a brief line of information intended to be read by a human operator.

```
FRIDAY, DECEMBER 29, 1978 15:18:22-EST NEW SESSION
FRIDAY, DECEMBER 29, 1978 15:18:24-EST SWF-D acquiring Station data
FRIDAY, DECEMBER 29, 1978 15:18:25-EST Loading work schedule
FRIDAY, DECEMBER 29, 1978 15:18:25-EST Initialization complete
FRIDAY, DECEMBER 29, 1978 15:18:25-EST Program in limbo
FRIDAY, DECEMBER 29, 1978 15:35:27-EST Loading work schedule
FRIDAY, DECEMBER 29, 1978 15:36:05-EST Top of the task queue
FRIDAY, DECEMBER 29, 1978 15:36:06-EST Next task:
FRIDAY, DECEMBER 29, 1978 15:36:06-EST Setting up to move waveforms
FRIDAY, DECEMBER 29, 1978 15:36:18-EST Working from file: ARRIVALS.Y1978%M05%D26
FRIDAY, DECEMBER 29, 1978 15:36:19-EST Checking Datacomputer status
FRIDAY, DECEMBER 29, 1978 15:36:36-EST OK to connect to Datacomputer
FRIDAY, DECEMBER 29, 1978 15:36:56-EST Beginning Datacomputer session
FRIDAY, DECEMBER 29, 1978 16:10:14-EST Short period data
FRIDAY, DECEMBER 29, 1978 16:10:15-EST No LP waveforms to move
FRIDAY, DECEMBER 29, 1978 16:10:15-EST Working from file: SP-ARRIVALS.Y1978%M05%D26
FRIDAY, DECEMBER 29, 1978 16:19:41-EST End SP moves
FRIDAY, DECEMBER 29, 1978 16:19:48-EST Program in limbo
        .
        .
```

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SUNDAY, JANUARY 7, 1979 08:52:54-EST NEW SESSION
SUNDAY, JANUARY 7, 1979 08:52:56-EST SWF-D acquiring Station data
SUNDAY, JANUARY 7, 1979 08:52:56-EST Loading work schedule
SUNDAY, JANUARY 7, 1979 08:52:56-EST Initialization complete
SUNDAY, JANUARY 7, 1979 08:52:56-EST Program in limbo
SUNDAY, JANUARY 7, 1979 10:59:29-EST Beginning task processing
SUNDAY, JANUARY 7, 1979 10:59:30-EST Top of the task queue
SUNDAY, JANUARY 7, 1979 10:59:30-EST Next task:
SUNDAY, JANUARY 7, 1979 10:59:30-EST Program in limbo
SUNDAY, JANUARY 7, 1979 16:59:31-EST Next task:
SUNDAY, JANUARY 7, 1979 16:59:32-EST Scanning for arrivals
SUNDAY, JANUARY 7, 1979 16:59:32-EST Checking Datacomputer status
SUNDAY, JANUARY 7, 1979 16:59:44-EST OK to connect to Datacomputer
SUNDAY, JANUARY 7, 1979 17:00:16-EST Beginning Datacomputer session
SUNDAY, JANUARY 7, 1979 17:00:28-EST Starting day.mo.yr = 19.6.1978 for 12 days
SUNDAY, JANUARY 7, 1979 17:00:38-EST Scanning for arrivals in:
SUNDAY, JANUARY 7, 1979 17:00:38-EST %TOP.SDAC.VELANET.PESF.Y1978.M06.D19
SUNDAY, JANUARY 7, 1979 17:04:23-EST Scanning for arrivals in:
SUNDAY, JANUARY 7, 1979 17:04:23-EST %TOP.SDAC.VELANET.PESF.Y1978.M06.D20
SUNDAY, JANUARY 7, 1979 17:07:45-EST Scanning for arrivals in:
SUNDAY, JANUARY 7, 1979 17:07:45-EST %TOP.SDAC.VELANET.PESF.Y1978.M06.D21
SUNDAY, JANUARY 7, 1979 17:10:32-EST Scanning for arrivals in:
SUNDAY, JANUARY 7, 1979 17:10:32-EST %TOP.SDAC.VELANET.PESF.Y1978.M06.D22
SUNDAY, JANUARY 7, 1979 17:13:31-EST Scanning for arrivals in:
SUNDAY, JANUARY 7, 1979 17:13:32-EST %TOP.SDAC.VELANET.PESF.Y1978.M06.D23
SUNDAY, JANUARY 7, 1979 17:16:26-EST Scanning for arrivals in:
SUNDAY, JANUARY 7, 1979 17:16:27-EST %TOP.SDAC.VELANET.PESF.Y1978.M06.D24
SUNDAY, JANUARY 7, 1979 17:19:05-EST Scanning for arrivals in:
SUNDAY, JANUARY 7, 1979 17:19:05-EST %TOP.SDAC.VELANET.PESF.Y1978.M06.D25
SUNDAY, JANUARY 7, 1979 17:21:53-EST Scanning for arrivals in:
SUNDAY, JANUARY 7, 1979 17:21:53-EST %TOP.SDAC.VELANET.PESF.Y1978.M06.D26
SUNDAY, JANUARY 7, 1979 17:25:07-EST Scanning for arrivals in:
SUNDAY, JANUARY 7, 1979 17:25:07-EST %TOP.SDAC.VELANET.PESF.Y1978.M06.D27
SUNDAY, JANUARY 7, 1979 17:28:04-EST Scanning for arrivals in:
SUNDAY, JANUARY 7, 1979 17:28:05-EST %TOP.SDAC.VELANET.PESF.Y1978.M06.D28
SUNDAY, JANUARY 7, 1979 17:31:01-EST Checking Datacomputer status
SUNDAY, JANUARY 7, 1979 17:31:12-EST OK to connect to Datacomputer
SUNDAY, JANUARY 7, 1979 17:31:23-EST Scanning for arrivals in:
SUNDAY, JANUARY 7, 1979 17:31:23-EST %TOP.SDAC.VELANET.PESF.Y1978.M06.D29
```

```
SUNDAY, JANUARY 7, 1979 17:35:37-EST Scanning for arrivals in:
SUNDAY, JANUARY 7, 1979 17:35:37-EST %TOP.SDAC.VELANET.PESF.Y1978.M06.D30
SUNDAY, JANUARY 7, 1979 17:39:12-EST No flagged arrivals.
SUNDAY, JANUARY 7, 1979 17:39:13-EST Ending Datacomputer session
SUNDAY, JANUARY 7, 1979 17:39:27-EST Next task:
SUNDAY, JANUARY 7, 1979 17:57:40-EST Program in limbo
SUNDAY, JANUARY 7, 1979 19:57:41-EST Next task:
SUNDAY, JANUARY 7, 1979 19:57:42-EST Generating segment availability map
SUNDAY, JANUARY 7, 1979 19:57:42-EST Checking Datacomputer status
SUNDAY, JANUARY 7, 1979 19:57:54-EST OK to connect to Datacomputer
SUNDAY, JANUARY 7, 1979 19:58:14-EST Beginning Datacomputer session
SUNDAY, JANUARY 7, 1979 19:58:18-EST Starting day.mo.yr = 23.7.1978 for 3 days
SUNDAY, JANUARY 7, 1979 20:09:22-EST %TOP.SDAC.VELANET.NSPF.Y1978.M07.D23 [OK]
SUNDAY, JANUARY 7, 1979 20:15:52-EST %TOP.SDAC.VELANET.NSPF.Y1978.M07.D24 [OK]
SUNDAY, JANUARY 7, 1979 20:21:11-EST %TOP.SDAC.VELANET.NSPF.Y1978.M07.D25 [OK]
SUNDAY, JANUARY 7, 1979 20:21:12-EST Checking Datacomputer status
SUNDAY, JANUARY 7, 1979 20:21:20-EST OK to connect to Datacomputer
SUNDAY, JANUARY 7, 1979 20:21:24-EST Ending Datacomputer session
SUNDAY, JANUARY 7, 1979 20:21:28-EST Next task:
SUNDAY, JANUARY 7, 1979 20:21:29-EST Program in limbo
        .
        .
        .
```

G. Programmed Operator Functions

Whenever the SWF-D program is not actively executing a task, it may be interrupted by attaching the program's Tenex job and then typing control-C, control-L or control-S.

The control-C interrupt will stop the running program -- just as it would for any Tenex-based job. The control-L interrupt causes the program to transfer control to the LoadWorkSchedule routine, described above in Section 4.1.1. The control-S interrupt causes the program to transfer control to the SetStationData routine, described above in Section 4.1.2.

This appendix describes:

- how to ascertain program status;
- how to interrupt the program;
- the control-S functions; and
- the control-L functions.

G.1 How to Ascertain Program Status

. By running DCSTAT at Tenex Exec level:

The figure below shows the SWF-D program at work. The job is logged in as CCA-SWF, which is local Tenex directory #72.

```
] CCA DC-203       EXISTS
] (NORMAL OPERATION)
] ;        STATUS MSG AT FRI 6 JAN 1979 19:22-EST
] ;;       Prime operation 9AM to 8PM weekdays
] ;;       Unattended operation 11PM to 5AM every day
] LISTENING FOR ADDITIONAL USERS
] SUBJOB 6  <==OPND==> CCA-7200013/2 [6512/17568]
]   DATA 6  <--CLZW-- CCA-7200015
```

. By checking the local <CCA-SWF> SWF-D.OPERATIONS file:

The last line of the log will indicate whether or not the program is in a period of suspended operation. See Appendix F for samples of log output.

G.2 The Control-S Functions

In response to typing control-S to the running program:

G.2.1 Programmed Response to Question-mark

```
Select operation (? for options):
?
        ?  =>  Display menu of operations
        P  =>  Print current info
        C  =>  Change ASL date for all Stations
        S  =>  Set SPDET date for all Stations
        U  =>  Update ASL data by Station
        A  =>  Add a new Station
        D  =>  Delete a Station
        I  =>  Initialize data by Station
        Q  =>  Quit [return to task processing]
```

G.2.2 Print Current Info

```
Select operation (? for options):
print
```

Station	From:	To:	SPDET-Date:
ANMO	1-10-1976	9-5-1978	26-7-1978
BOCO	13-3-1978	13-5-1978	26-7-1978
CHTO	1-7-1977	5-4-1978	26-7-1978
CTAO	1-1-1977	26-4-1978	26-7-1978
GUMO	1-1-1977	1-5-1978	26-7-1978
KAAO	1-11-1977	24-4-1978	26-7-1978
MAIO	1-1-1977	9-5-1978	26-7-1978
MAJO	1-11-1977	27-4-1978	26-7-1978
NWAO	1-1-1977	8-5-1978	26-7-1978
SNZO	5-5-1977	23-4-1978	26-7-1978
TATO	18-7-1977	8-5-1978	26-7-1978
ZOBO	1-1-1977	19-4-1978	26-7-1978
SHIO	1-8-1978	23-8-1978	26-7-1978

```
AllStationsASLDate = 26-7-1978

AllStationsSPDETDate = 26-7-1978
```

G.2.3 Change ASL Date for All Stations

```
Select operation (? for options):
change ASL date for all Stations to [day month year]: 1 1 1111
        [OK]

AllStationsASLDate = 1 1 1111

Select operation (? for options):
Change ASL date for all Stations to [day month year]: 26 7 1978
        [OK]

AllStationsASLDate = 26 7 1978
```

G.2.4 Set SPDET Date for All Stations

```
Select operation (? for options):
set SPDET date for all Stations to [day month year]: 2 2 2222
        [OK]

AllStationsSPDETDate = 2 2 2222

Select operation (? for options):
Set SPDET date for all Stations to [day month year]: 26 7 1978
        [OK]

AllStationsSPDETDate = 26 7 1978
```

G.2.5 Update ASL Data by Station

```
Select operation (? for options):
update ASL data
ANMO:   old date = 9 5 1978     new date [day month year] = 3 3 3333
BOCO:   old date = 13 5 1978    new date [day month year] = 4 4 4444
CHTO:   old date = 5 4 1978     new date [day month year] = 5 5 5555
  .
  .
  .
ZOBO:   old date = 19 4 1978    new date [day month year] = 8 8 8888
SHIO:   old date = 23 8 1978    new date [day month year] = 9 9 9999

Select operation (? for options):
print
    Station     From:           To:             SPDET-Date:

    ANMO        1-10-1976       3-3-3333        26-7-1978
    BOCO        13-3-1978       4-4-4444        26-7-1978
    CHTO        1-7-1977        5-5-5555        26-7-1978
      .
      .
      .
    ZOBO        1-1-1977        8-8-8888        26-7-1978
    SHIO        1-8-1978        9-9-9999        26-7-1978

AllStationsASLDate = 26-7-1978

AllStationsSPDETDate = 26-7-1978
```

G.2.6 Add New Station

```
Select operation (? for options):
add new Station:  Name = mars

From date [day month year]:  31 12 1978

To date [day month year]:  31 1 1979

Select operation (? for options):
print
    Station      From:            To:              SPDET-Date:

    ANMO         1-10-1976        3-3-3333         26-7-1978
    BOCO         13-3-1978        4-4-4444         26-7-1978
    CHTO         1-7-1977         5-5-5555         26-7-1978
        ...
    ZOBO         1-1-1977         8-8-8888         26-7-1978
    SHIO         1-8-1978         9-9-9999         26-7-1978
    mars         31-12-1978       31-1-1979        0-0-0

AllStationsASLDate = 26-7-1978

AllStationsSPDETDate = 26-7-1978
```

G.2.7 Delete Station

```
Select operation (? for options):
delete Station Name:  MARS

Station MARS not found

Select operation (? for options):
Delete Station Name:  BOCO

Select operation (? for options):
print
    Station      From:            To:              SPDET-Date:

    ANMO         1-10-1976        3-3-3333         26-7-1978
    mars         13-3-1978        31-1-1979        26-7-1978
    CHTO         1-7-1977         5-5-5555         26-7-1978
     .
     .
     .
    ZOBO         1-1-1977         8-8-8888         26-7-1978
    SHIO         1-8-1978         9-9-9999         26-7-1978

AllStationsASLDate = 26-7-1978

AllStationsSPDETDate = 26-7-1978
```

```
Select operation (? for options):
delete Station Name:  mars

Select operation (? for options):
print
    Station      From:           To:             SPDET-Date:

    ANMO         1-10-1976       3-3-3333        26-7-1978
    SHIO         13-3-1978       9-9-9999        26-7-1978
    CHTO         1-7-1977        5-5-5555        26-7-1978
      .
      .
      .
    ZOBO         1-1-1977        8-8-8888        26-7-1978

AllStationsASLDate = 26-7-1978

AllStationsSPDETDate = 26-7-1978
```

G.2.8 Initialize All Stations

```
Select operation (? for options):
initialize all Stations

Station name:  AAAA

From date [day month year]:  1 1 1979

To date [day month year]:  31 1 1979

More? [Y|N]      yes

Station name:  ZZZZ

From date [day month year]:  1 1 1979

To date [day month year]:  31 1 1979

More? [Y|N]      no

Select operation (? for options):
print
    Station      From:          To:            SPDET-Date:

    AAAA         1-1-1979       31-1-1979      0-0-0
    ZZZZ         1-1-1979       31-1-1979      0-0-0

AllStationsASLDate = 1-1-1978

AllStationsSPDETDate = 0-0-0


Select operation (? for options):
quit
```

G.3 The Control-L Functions

In response to typing control-l to the running program:

G.3.1 Programmed Response to Question-mark

```
Select item to print|update: ?
        ?  =>  Display items
        I  =>  Set Interval for automatic program delay
        L  =>  Set load limit
        C  =>  Clear task chain
        N  =>  Next task check
        A  =>  Append to task queue
        E  =>  Set ESF Current Date
        W  =>  Set work schedule
        V  =>  View current task queue
        Q  =>  Quit [return to task processing]
```

G.3.2 Setting Some Control Variables

```
Select item to print|update:  interval = 1
                                        Change it? [Y|N] yes
[OK]    New Interval = 2
Interval reset to:  2   Change it? [Y|N]  no


Select item to print|update:  load limit = 3
                                        Change it? [Y|N]  yes
[OK]    New load limit:  1.5
Load Limit reset to:  1.5       Change it? [Y|N]  yes
[OK]    New load limit:  1.1416
Load Limit reset to:  1.1416    Change it? [Y|N]  no


Select item to print|update:
          eSFCurrentDate [day month year]  =  26-7-1978
Change it? [Y|N]        yes     [OK]    New date :=  1 1 1111
ESFCurrentDate [day month year]  =  1-1-1111
Change it? [Y|N]        yes     [OK]    New date :=  26 7 1978
ESFCurrentDate [day month year]  =  26-7-1978
Change it? [Y|N]        no
```

G.3.3 Programming Task Queue

G.3.3.1 Programmed Response to Question-mark

```
Task := ?
        ?  =>  Display list of tasks
        E  =>  Scan ESF for arrivals
        G  =>  Generate segment availability map
        M  =>  Move waveforms
        U  =>  Update ESF
        W  =>  Wait (program delay) n hours
        T  =>  Go to top of task queue
        R  =>  Restart at top of task queue

        V  =>  View current task queue
        C  =>  Clear current task queue
        Q  =>  Quit [review SWF-D control variables]
```

G.3.3.2 Viewing Task Queue

```
Task := view task queue [OK]

Task-index      Task

        1       Limbo   6 hours
        3       Get Arrivals
        4       Limbo   2 hours
        6       Generate SPDET Map
        7       Limbo   12 hours
        9       Transfer to top of task queue

Current task index = 3
Current task limit = 9
```

G.3.3.3 Task Selection

```
Task := clear task chain

Ready to initialize work schedule

Task := view task queue [OK]

Task-index      Task


Current task index = 0
Current task limit = 0

Task := eSF scan for arrivals   [OK]

Task := wait n hours    [OK]
# hours = 1

Task := generate segment map    [OK]

Task := wait n hours    [OK]
# hours = 1

Task := move waveforms  [OK]

Task := wait n hours    [OK]
# hours = 2

Task := update ESF      [OK]

Task := wait n hours    [OK]
# hours = 1

Task := r       Start at top of queue   [OK]
```

```
Task := view task queue [OK]

Task-index      Task

        1       Get Arrivals
        2       Limbo   1 hours
        4       Generate SPDET Map
        5       Limbo   1 hours
        7       Append to SWF
        8       Limbo   2 hours
        10      Update ESF
        11      Limbo   1 hours
        13      Transfer to top of task queue

Current task index = 0
Current task limit = 13

Task := quit    [OK - on to review control variables]
```

G.3.4 Resume Task Processing

```
Select item to print|update:  quit [resume task processing]
```

H. Advisory Information from ASL

H.1 A Sample ASL Progress Note

16-JAN-79 11:56:54,1409
Net mail from site USC-ISIC rcvd at 16-JAN-79 11:56:50
Date: 16 JAN 1979 0856-PST
From: JHOFFMAN at USC-ISIC
Subject: Seismic Data transmitted to Datacomputer
To: Filson at ISI, Julian at ISI, Hill at SDAC-44, DEE at CCA,
To: JZS at CCA, Rsheppard at BBNE, North at LL-ASG,
To: Sargent at LL-ASG, Turek at LL-ASG
cc: JHoffman

As of Jan 16, 1979 SRO and ASRO data stored in the Datacomputer is as follows:

ANMO	Oct 01, 1976	to	Aug 15, 1978
BOCO	Mar 13, 1978	to	Aug 01, 1978
CHTO	Jul 01, 1977	to	Aug 24, 1978
GUMO	Jan 01, 1977	to	Aug 07, 1978
MAIO	Jan 01, 1977	to	Aug 17, 1978
NWAO	Jan 01, 1977	to	AUG 14, 1978
SHIO	Aug 01, 1978	to	Aug 23, 1978
SNZO	May 05, 1977	to	Aug 13, 1978
TATO	Jul 18, 1977	to	Jul 29, 1978
CTAO	Jan 01, 1977	to	Aug 24, 1978
KAAO	Nov 01, 1977	to	Jun 25, 1978
MAJO	Nov 01, 1977	to	Jul 26, 1978
ZOBO	Jan 01, 1977	to	Aug 18, 1978

SHIO became operational on Aug 1, 1978.
KAAO was inoperative from Jun 26 to Aug 14, 1978.

Station downtimes through November, 1978 are listed in the STATION/DATA/STATUS/NOV78.TXT;1 file in the SEISNET directory, password WORLDWIDE, under ISI.

John Hoffman

H.2 Excerpt from file STATION/DATA/STATUS/NOV78.TXT

This file lists the dates for each station when no data were recorded or when some qualifications exist on the recorded data beginning Jan 1, 1976. Although the HGLP stations have been in operation for several years, most of the SRO and ASRO stations were installed during 1976 and 1977. For the SRO and ASRO stations the date following the station name is the effective reporting date for these stations. Notes at the end of the file indicate the reasons for no data or for qualified data.
The average digital tape contains 14 days of data. Transit times for the tapes from the stations to Albuquerque varies from 1 to 4 weeks. When no data has been received from a station for 6 weeks, the day of the last data received is noted.

****HGLP STATION STATUS****

[data deliberately omitted]

****SRO STATION STATUS****

ANMO - Albuquerque, New Mexico Jan 1, 1976
  No Data:
    Jan 14, (1950hr) - Jan 16, 1976 (2045hr) <2>
    Jan 19, (1630hr) - Jan 22, 1976 (2130hr) <2>
    Feb 02, (2355hr) - Feb 03, 1978 (1729hr) <3>
    Feb 11, (2350hr) - Feb 13, 1978 (1717hr) <3>
    Oct 31, (2140hr) - Nov 01, 1978 (1715hr) <2>
    Dec 02, (1430hr) - Dec 04, 1978 (2115hr) <2>
  Qualified Data:
ANTO - Ankara, Turkey Aug 1, 1978
  No Data:
    Aug 28, (0730hr) - Aug 30, 1978 (1430hr) <7>
BOCO - Bogota, Columbia Mar 13, 1978
  No Data:
    Jun 07, (1815hr) - Jun 08, 1978 (1530hr) <2>
    Jun 15, (1430hr) - Jun 17, 1978 (1640hr) <2>
    Jul 17, (2045hr) - Jul 18, 1978 (1930hr) <2>
    Jul 17, (2045hr) - Jul 18, 1978 (1930hr) <7>
    Aug 04, (1645hr) - Aug 05, 1978 (1715hr) <2>
    Aug 08, (1320hr) - Aug 15, 1978 (1600hr) <2>
    Oct 28, (0045hr) - Oct 31, 1928 (2245hr) <2>
  Qualified Data:

July 15, 1978 <10>

CHTO - Chaing Mai, Thailand Jul 1, 1977

No Data:

Oct 07, (0000hr) - Oct 10, 1977 (0330hr) <7>
Oct 26, (0230hr) - Nov 02, 1977 (1200hr) <1>
Dec 14, (2330hr) - Dec 18, 1977 (0250hr) <2>
Apr 05, (0345hr) - May 15, 1978 (1430hr) <2>
Jul 27, (1730hr) - Jul 28, 1978 (1200hr) <2>
May 26, (0750hr) - Jun 13, 1978 (0415hr) <7>
Sep 01, (2145hr) - Oct 09, 1978 (0800hr) <3>
Sep 12, (0330hr) - Sep 15, 1978 (0320hr) <1>
Oct 20, (0755hr) - Oct 23, 1978 (0145hr) <2>

Qualified Data:

Mar 28, (1400hr) - Apr 05, 1978 (0345hr) <4>

GRFO - Grafensburg, Germany Oct 1, 1978

No Data:

GUMO - Guam, Marianas Islands Jan 1, 1976

No Data:

Apr 5, (0700hr) - Apr 8, 1976 (0100hr) <7>
May 21, (0900hr) - Jun 10, 1976 (0400hr) <3>
Jul 10, (0400hr) - Jul 30, 1976 (2230hr) <2>
Apr 18, (0240hr) - Apr 30, 1977 (2400hr) <2>
Jun 04, (0030hr) - Jun 06, 1977 (0540hr) <7>
Jul 21, (2200hr) - Jul 23, 1977 (0045hr) <3>
Aug 17, (1420hr) - Sep 27, 1977 (0245hr) <2>

Qualified Data:

MAIO - Mashhad, Iran Jan 1, 1976

No Data:

Feb 12, (0800hr) - Feb 19, 1976 (0120hr) <2>
Mar 13, (0845hr) - Mar 16, 1976 (0715hr) <2>
Mar 09, (2130hr) - Mar 12, 1977 (0750hr) <2>
Mar 28, (1200hr) - Mar 31, 1977 (1340hr) <3>
Aug 10, (0600hr) - Oct 01, 1977 (0800hr) <2>
Oct 08, (0500hr) - Oct 12, 1977 (1200hr) <2>
Oct 25, (0730hr) - Oct 26, 1977 (0715hr) <7>
Nov 27, (0530hr) - Dec 02, 1977 (0500hr) <2>
Jan 09, (0405hr) - Jan 14, 1978 (0600hr) <3>
Jan 16, (0740hr) - Jan 19, 1978 (0915hr) <3>
Jan 21, (1625hr) - Mar 01, 1978 (1125hr) <2>
Apr 12, (1140hr) - Apr 13, 1978 (0520hr) <3>
Apr 25, (1606hr) - Apr 26, 1978 (0530hr) <3>
Jul 05, (0445hr) - Jul 09, 1978 (1400hr) <2>
Sep 04, (0605hr) - Sep 06, 1978 (0620hr) <2>
Oct 11, (1300hr) - <2>

Qualified Data:

NWAO - Mundaring (Narrogin), W.A. Mar 9, 1976

No Data:

Oct 20, (0745hr) - Oct 23, 1976 (0530hr) <7>
Jan 02, (1800hr) - Jan 04, 1977 (0600hr) <2>
Jan 02, (1800hr) - Jan 04, 1977 (0600hr) <2>

Jan 14, (0800hr) - Jan 15, 1977 (1100hr) <2>
Nov 07, (0300hr) - Nov 28, 1977 (0230hr) <2>
May 31, (0110hr) - Jun 04, 1978 (0715hr) <2>
Qualified Data:
Mar 09, (0000hr) - May 11, 1976 (2100hr) <10>
May 11, (2100hr) - Jun 07, 1976 (0330hr) <9>
Jun 21, - Jul 19, 1976 <10>

SHIO - Shillong, India Aug 1, 1978
No Data:
Sep 21, (0940hr) - Sep 23, 1978 (0510hr) <2>

SNZO - Wellington (South Karori), N.Z. Feb 25, 1976
No Data:
Apr 9, (0600hr) - Apr 18, 1976 (2200hr) <1>
Jun 15, (2330hr) - Jun 16, 1976 (2115hr) <2>
Sep 12, (2330hr) - Oct 1, 1976 (0220hr) <4>
Nov 10, (2140hr) - Nov 12, 1976 (0310hr) <7>
Nov 21, 1976 - May 05, 1977 (0000hr) <2>
Dec 06, (0000hr) - Dec 28, 1977 (2100hr) <2>
Jan 04, (0650hr) - Jan 05, 1978 (0200hr) <3>
Jun 5, (2230hr) - Jun 18, 1978 (2345hr) <10>
Sep 24, (2220hr) - Oct 31, 1978 (2145hr) <5,10>
Qualified Data:
Apr 18, (2200hr) - May 02, 1976 (2000hr) <9>
Feb 25, (0000hr) - Nov 21, 1976 (2200hr) <10>
May 05, 1977 - Oct 31, 1978 (2145hr) <9>
May 22, 1978 - Oct 31, 1978 (2145hr) <10>
Jul 31, (2130hr) - Sep 24, 1978 (2220hr) <5EW>

TATO - Taipei, Taiwan May 13, 1976
No Data:
Jun 25, (0715hr) - Jun 27, 1976 (0130hr) <2>
Aug 09, (1700hr) - Aug 15, 1976 (1530hr) <2>
Sep 20, 1976 - Jul 18, 1977 (0430hr) <2>
Jul 31, (1105hr) - Aug 06, 1977 (0330hr) <2>
Aug 19, (1245hr) - Aug 23,1977 (0850hr) <7>
Jun 14, (0220hr) - Jun 15, 1978 (0845hr) <2>
Jun 28, (0740hr) - Jun 29, 1978 (0900hr) <2>
Jun 30, (0700hr) - Jul 14, 1978 (0340hr) <2>
Jun 30, (0445hr) - Jul 14, 1978 (0340hr) <2>
Jul 29 (0350hr) - Aug 19, 1978 (0320hr) <7>
Sep 24, (0825hr) - Sep 25, 1978 (0244hr) <2>
Oct 03, (0500hr) - Oct 06, 1978 (0715hr) <1>
Qualified Data:

****ASRO STATION STATUS****

CTAO - Charters Towers, Australia Oct 9, 1976
No Data:
Apr 29, (2320hr) - Jun 08, 1977 (0100hr) <2>

KAAO - Kabul, Afganistan May 5, 1977
No Data:

May 25, (0730hr) - Jun 08, 1977 (1045hr) <2>
Jun 22, (0700hr) - Jul 10, 1977 (0615hr) <2>
Jul 15, (0815hr) - Jul 17, 1977 (1100hr) <2>
Jul 31, (1300hr) - Aug 06, 1977 (0520hr) <2>
Oct 14, (0730hr) - Oct 18, 1977 (1000hr) <2>
Nov 09, (1030hr) - Nov 13, 1977 (0630hr) <2>
Apr 24, (0530hr) - May 08, 1978 (0650hr) <7>
Jun 13, (1820hr) - Jun 15, 1978 (0520hr) <2>
Jun 26, (2330hr) - Aug 14, 1978 (0835hr) <2>
Oct 28, (1045hr) - Oct 29, 1978 (0730hr) <2>

Qualified Data:

Jun 11, (1610hr) - Jun 13, 1978 (1820hr) <5NS>

KONO - Kongsberg, Norway Aug 15, 1978

No Data:

MAJO - Matsushiro, Japan Jul 07, 1977

No Data:

oct 01, (0245hr) - Oct 20, 1977 (0200hr) <2>
Nov 23, (0630hr) - Dec 11, 1977 (0200hr) <2>
Dec 14, (0030hr) - Jan 01, 1978 (0000hr) <2>
Mar 02, (0640hr) - Mar 30, 1978 (0116hr) <2,1>
Jul 26, (0410hr) - Jul 27, 1978 (0120hr) <2>
Jul 26, (0410hr) - Jul 27, 1978 (0125hr) <7>
Aug 06, (0900hr) - Aug 09, 1978 (0500hr) <2>
Aug 21, (0030hr) - Sep 08, 1978 (0050hr) <2>

Qualified Data:

Aug, 1977 - Mar 30, 1978 <4NS>
Mar 30, (0116hr) - May 31, 1978 <8NS>
Jul 22, (1210hr) - Jul 31, 1978 (0310hr) <9>

ZOBO - Zongo Valley, Bolivia Sept 10, 1976

No Data:

Sep 19, (0615hr) - Sep 21, 1976 (1530hr) <3>
Dec 02, (1600hr) - Dec 28, 1976 (1930hr) <2>
Jan 09, (0600hr) - Jan 11, 1977 (1930hr) <2>
Apr 05, (1750hr) - Apr 07, 1977 (1630hr) <7>
Jul 26, (1530hr) - Aug 04, 1977 (0205hr) <2>
Aug 12, (1645hr) - Aug 16, 1977 (1900hr) <2>
Sep 03, (1150hr) - Sep 04, 1977 (1210hr) <3>
Oct 17, (0400hr) - Nov 08, 1977 (2100hr) <2>
Feb 14, (0000hr) - Apr 04, 1978 (1835hr) <2>
Apr 19, (1450hr) - May 02, 1978 (1855hr) <2>
Jul 11, (1500hr) - Jul 14, 1978 (1955hr) <2>
Jul 11, (1500hr) - Jul 14, 1978 (1955hr) <2>
Sep 07, (1540hr) - Sep 13, 1978 (1725hr) <1>

Qualified Data:

Jan 19, (1400hr) - Jan 24, 1977 (1630hr) <12>
Dec 27, (1028hr) - Feb 10, 1978 (1640hr) <5E>
Feb 10, (1640hr) - Feb 14, 1978 (0000hr) <5N,E>

NOTES

<1> Station maintenance - calibration
<2> Equipment Failure
<3> Power outage
<4> Spiking or high background noise
<5> Component(s) down
<6> Riffled tape edges
<7> Missing Data
<8> Polarity reversal
<9> Long Period data only
<10> Line Dropouts (Telemetry)
<11> Conversion to SRO or ASRO
<12> No Long Period data

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I. Glossary of Abbreviations

ARPA	Advanced Research Projects Agency
ASL	Albuquerque Seismological Laboratory
CCA	Computer Corporation of America
ESF	Event Summary File
FESF	Final Event Summary File
FSWF	Final Signal Waveform File
LL-ASG	Lincoln Laboratory, Applied Seismology Group
NEP	Network Event Processor
NLPF	Non-Array Long-Period File
NMRO	Nuclear Monitoring Research Office
NSPF	SRO Short-Period File
PESF	Preliminary Event Summary File
PSWF	Preliminary Signal Waveform File
SDAC	Seismic Data Analysis Center
SRO	Seismic Research Observatories
SWF	Signal Waveform File
SWF-D	Signal Waveform File - Demon program
VSC	Vela Seismological Center

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